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SESSIONAL PAPERS

VOL. XXXIII.—PART V.

FOURTH SESSION, NINTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

51905
1901

SESSION 1901.

TORONTO:
PRINTED AND PUBLISHED BY L. K. CAMERON
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1901.

WARWICK BRO'S & RUTTER, Printers.
TORONTO.

LIST OF SESSIONAL PAPERS.

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ARRANGED ALPHABETICALLY.

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Aliens, Employment of on Railways	65	"
Assessment, Interim Report of Commission	44	*Printed.*
Asylums, Report	35	"
Awards on Unsettled Accounts	58	"
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Births, Marriages and Deaths, Report	9	*Printed.*
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Title.	No	Remarks.
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" Correspondence *re* Enforcement of Act	79	*Not Printed.*
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Gaols, Prisons and Reformatories, Report	36	"
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*Printed for distribution only.

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San José Scale, Report	49	*Printed.*
Secretary and Registrar, Report	34	"
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Sugar Beet Investigation, Report	48	*Printed.*
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LIST OF SESSIONAL PAPERS.

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No. 1.. Public Accounts of the Province, for the year 1900. Presented to the Legislature, 13th February, 1901. *Printed*

No. 2.. Estimates (*Vote of Credit*) for the year 1901. Presented to the Legislature, 12th February, 1901. *Not Printed* Estimates for the year 1901. Presented to the Legislature, 18th February, 1901. *Printed.* Estimates —Supplementary. Presented to the Legislature, 2nd April, 1901. *Printed.*

No. 3.. Report of the Commissioner of Crown Lands for the year 1900. Presented to the Legislature, 22nd March, 1901. *Printed.*

CONTENTS PART II.

No. 4.. Report of the Clerk of Forestry for the year 1900. Presented to the Legislature, 1st April, 1901. *Printed.*

No. 5.. Report of the Bureau of Mines for the year 1900 Presented to the Legislature, 21st March, 1901. *Printed.*

No. 6.. Report of the Commissioners for the Queen Victoria Niagara Falls Park for the year 1900. Presented to the Legislature, 19th March, 1901. *Printed.*

No. 7.. Report of the Commissioner of Public Works for the year 1900. Presented to the Legislature, 19th March, 1901. *Printed.*

No 8.. Report of the Inspectors of Factories for the year 1900. Presented to the Legislature, 1st April, 1901. *Printed.*

No 9.. Report upon the Registration of Births, Marriages and Deaths in the Province, for the year 1900. Presented to the Legislature, 13th February, 1901. *Printed*

CONTENTS PART III.

No 10.. Report of the Inspector of Insurance and Registrar of Friendly Societies for the year 1901. Presented to the Legislature, 1st April, 1901. *Printed.*

No. 11.. Report on the Financial Statements made by Loan Corporations for the year 1900. Presented to the Legislature, 1st April, 1901. *Printed.*

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No. 12.. Report of the Minister of Education for the year 1900, with the Statistics for the year 1899. Presented to the Legislature, 14th March, 1901. *Printed.*

No. 13.. Reports of the University of Toronto for 1900-1901. Presented to the Legislature, 22nd March, 1901. *Printed.*

No. 14.. Report of the Ontario Agricultural College and Experimental Farm, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

No. 15.. Report of the Agricultural and Experimental Union of Ontario, for the year 1900. Presented to the Legislature, 6th March, 1901. *Printed.*

No. 16.. Report of the Fruit Growers' Association of Ontario, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

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No. 17.. Report of the Fruit Experiment Stations of Ontario, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

No. 18.. Report of the Inspector of Fumigation Appliances in Ontario, for the year 1900. Presented to the Legislature, 4th March, 1901. *Printed.*

No 19.. Report of the Entomological Society for the year 1900. Presented to the Legislature, 22nd February, 1901. *Printed.*

No. 20.. Report of the Bee-keepers' Association for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

No. 21.. Report of the Poultry Associations of the Province, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

No. 22.. Report of the Dairymen's Associations of Eastern and Western Ontario, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

No. 23.. Report of the Live Stock Associations of the Province, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed*

No. 24.. Report of the Registrar of Live Stock in the Province, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed.*

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No. 25.. Report of the Superintendent of Farmers' Institutes of the Province, for the year 1900. Presented to the Legislature, 26th March, 1901. *Printed*

No. 26.. Report of the Bureau of Industries for 1900. Presented to the Legislature, 14th March, 1901. *Printed.*

No. 27.. Report of the Provincial Instructor in Roadmaking in Ontario, for the year 1900. Presented to the Legislature, 28th March, 1901. *Printed.*

No. 28.. Report of the Ontario Game and Fish Commissioners for the year 1900. Presented to the Legislature, 29th March, 1901. *Printed.*

No. 29.. Report of the Department of Colonization and Immigration for the year 1900. Presented to the Legislature, 1st April, 1901. *Printed.*

No. 30.. Report of the Inspector of Division Courts for the year 1900. Presented to the Legislature, 15th February, 1901. *Printed.*

No 31.. Report of the Inspector of Legal Offices for the year 1900. Presented to the Legislature, 22nd March, 1901. *Printed.*

No. 32.. Report of the Inspector of Registry Offices for the year 1900, with statement of fees and emoluments of Registrars. Presented to the Legislature, 22nd March 901. *Printed.*

No. 33.. Report of the Provincial Board of Health for the year 1900. Presented to the Legislature, 22nd March, 1901. *Printed.*

No. 34.. Report of the Secretary and Regi-trar of the Province, for the year 1900 Presented to the Legislature, 22nd March, 1901. *Printed.*

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No. 35.. Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1900. Presented to the Legislature, 13th February, 1901. *Printed.*

No. 36. Report upon the Common Gaols, Prisons and Reformatories of the Province, for the year ending 30th September, 1900. Presented to the Legislature, 3rd April, 1901. *Printed.*

No 37. Report upon the Hospitals and Refuges of the Province, for the year ending 30th September, 1900. Presented to the Legislature, 27th March, 1901. *Printed.*

No. 38.. Report upon the Institution for the education of the Blind, Brantford, for the year ending 30th September, 1900 Presented to the Legislature, 13th February, 1901. *Printed.*

No. 39. Report upon the Institution for the education of the Deaf and Dumb, Belleville, for the year ending 30th September, 1900. Presented to the Legislature, 13th February, 1901. *Printed.*

No. 40.. Report upon the work under the Children's Protection Act, for the year 1900. Presented to the Legislature, 14th February, 1901. *Printed.*

No 41.. Report upon the working of the Tavern and Shop Licenses Act, for the year 1900. Presented to the Legislature, 13th February, 1901. *Printed*

No. 42.. Report of the Provincial Municipal Auditor for the year 1900. Presented to the Legislature, 4th March, 1901. *Printed*

No. 43.. Return from the Records of the several Elections to the Legislative Assembly in the Electoral Districts of North Renfrew, North Waterloo, and Welland, since the General Election of March 1st, 1898, shewing:—(1) The number of Votes polled for each Candidate in the Electoral District in which there was a contest. (2) The majority whereby each successful candidate was returned. (3) The total number of Votes polled in each District. (4) The number of Votes remaining unpolled. (5) The number of names on the Voters' Lists in each District. (6) The population of each District as shown by the census. Presented to the Legislature, 7th February, 1901. *Printed.*

CONTENTS PART VIII.

No. 44.. Interim Report and Record of Proceedings, of the Commissioners appointed by Commission under the Great Seal to enquire into and report upon questions of Municipal Assessment and Taxation. Presented to the Legislature, 18th February, 1901. *Printed.*

CONTENTS PART IX.

No. 45.. Report of the Librarian upon the state of the Legislative Library. Presented to the Legislature, 6th February, 1901. *Not printed.*

No. 46.. Report of the Commissioners in regard to the alleged offences and irregularities in the West Elgin Election. Presented to the Legislature, 13th February, 1901. *Printed.*

No. 47.. Report of the Bureau of Labor for the year 1900. Presented to the Legislature, 13th February, 1901. *Printed*

No. 48.. Report of the Sugar Beet Investigation. Presented to the Legislature, 28th February, 1901.

No. 49.. Report of the Inspector of the San José Scale for the year 1900. Presented to the Legislature, 2nd April, 1901. *Printed.*

No. 50.. Report of the Royal Commission on the Financial Position of the Province of Ontario. Presented to the Legislature, 21st February, 1901. *Printed.*

No. 51.. Report of the Survey and Exploration of Northern Ontario, during 1900. Presented to the Legislature, 2nd April, 1901. *Printed.*

No. 52.. Copy of Order-in-Council respecting payment to His Honour Judge Elliott, of Middlesex, of the surplus Surrogate fees of the County. Presented to the Legislature, 13th February, 1901. *Not Printed.*

No. 53.. Copy of an Agreement between the Inspector of Prisons and Public Charities and the H. A. Nelson & Sons Company, Limited. relative to the manufacture of brooms at the Central Prison. Presented to the Legislature, 14th February, 1901. *Not Printed.*

No. 54.. Return to an Order of the House, for a Return shewing the various unexpended grants to railways; the amounts authorized to be paid in cash subsidies, if earned, and grants of lands in the Province, if earned. Presented to the Legislature, 14th February, 1901. Mr. *Hoyle. Not Printed.*

No. 55.. Detailed Statement of all Bond and Securities, registered in the Provincial Registrar's Office during the year 1900. Presented to the Legislature, 20th February, 1901. *Not Printed.*

No. 56.. Return to an Order of the House, for a Return of a copy of the evidence taken before the Royal Commission for the investigation of the acts of the Returning Officer, Deputy Returning Officers and Poll Clerks, at the election held in the West Riding of the County of Elgin in the month of January, 1899. Presented to the Legislature, 27th February, 1901. Mr. *Whitney. Not Printed*

No. 57.. Statement as to distribution of the Statutes, Revised and Sessional, for the year 1900. Presented to the Legislature, 27th February, 1901. *Not Printed.*

No. 58.. Return to an Address, for copies of the Awards of the Arbitrators on the unsettled Accounts between the Dominion and the Provinces. Presented to the Legislature, 22nd March, 1901. Mr. *Matheson. Printed.*

No. 59.. Return to an Order of the House, for a Return shewing the amount of timber and saw-logs cut by the license holders on the road allowance in the Township of Grimsthorpe during the years 1899 and 1900, together with the

names of the foreman and jobbers by whom such timber was cut and the quantity cut by each. Presented to the Legislature, 12th March, 1901. Mr. *Allen* *Not Printed.*

No. 60.. Copies of Orders in-Council, made under the authority of the Act respecting the Department of Education. Presented to the Legislature, 13th March, 1901. *Not Printed.*

No 61.. Return to an order of the House, for a Return of copies of applications for admission into Normal Schools for the year 1901; the date of such applications; the number and names of those admitted; the date on which said applicants were notified of their admission; the number and names of those rejected; the date on which said applicants were notified of their rejection; the cause of their rejection; the numbers of teachers in training, the Normal Schools can accommodate, and the number of teachers in training now actually in attendance at such Normal Schools. Presented to the Legislature, 13th March, 1901. Mr. *Barr.* *Not Printed.*

No. 62.. Return to an Order of the House, for a Return shewing the location of any Cold Storage Station, or Stations, established under Act of last Session, with amounts paid. Presented to the Legislature, 13th March, 1901. Mr. *McLaughlin.* *Not Printed.*

No. 63.. Return to an order of the House, for a Return of copies of correspondence between any member of the Government or the Provincial Board of Health, or any official thereof, and the Mayor of the City of Windsor, or any other person or persons, in reference to an outbreak of smallpox in the County of Essex in March, 1899. Presented to the Legislature, 15th March, 1901. Mr. *Lucas.* *Not Printed.*

No. 64.. Return to an Order of the House, for a Return of copies of all correspondence between the Government of the Province of Ontario, or any member thereof, and the Imperial Government, or any official thereof, or His Excellency the Governor-General of Canada, with relation to the establishment of a Remount Station in Canada. Presented to the Legislature, 15th March, 1901. Mr. *Whitney* *Not Printed.*

No. 65.. Return to an Order of the House, for a Return of copies of all correspondence between the Government, or any member thereof, or any person or persons, or corporations with reference to the employment of Aliens on the construction work of any railway in the Province. Also, for a copy of any report made to the Government, or any member thereof, by any person with reference to such employment. Presented to the Legislature, 19th March, 1901. Mr. *Wardell.* *Not Printed.*

No. 66.. Copy of an Order in Council, amending the rules and regulations for the control and working of the Provincial Diamond Drills. Presented to the Legislature, 21st March, 1901. *Not printed.*

No. 67.. Return to an Order of the House, for a Return of copies of all correspondence, or other documents, concerning the granting, or refusal to grant, a liquor license to either the British Hotel, or the Central Hotel, in the Town of Durham, during the years 1898 or 1899 Presented to the Legislature, 21st March, 1901. Mr. *Lucas.* *Not printed.*

No. 68.. Report of the Department of Fisheries, of Ontario, for the year 1900. Presented to the Legislature, 3rd April, 1901. *Printed.*

No. 69.. Return to an Order of the House, for a Return shewing the names and addresses of all parties to whom permits were granted during the year 1900, for the destruction of insectivorous birds, or birds' eggs, and shewing as well, upon whose recommendation such permits were granted. Presented to the Legislature, 22nd March, 1901. Mr. *Monteith. Not printed.*

No. 70.. Report of District and Township, Agricultural and Horticultural Societies, for the year 1899. Presented to the Legislature, 25th March, 1901. *Not printed.*

No 71.. * Land Settlement in New Ontario, being a short account of advantages offered land seekers. Presented to the Legislature, 27th March, 1901. *Printed for distribution only.*

No. 72.. * Statement concerning the extent, resources, climate and industrial development of the Province. Presented to the Legislature, 27th March, 1901. *Printed for distribution only.*

No. 73 . Return to an Order of the House, for a Return, shewing the names and addresses of all parties tendering—where tenders were called for—for coal, wood and fresh meats, or any of them, for the uses of the Asylum at Brockville, during the year 1900, with copies of the tenders put in by each party tendering; copy of the specifications issued in each case, where tenders were called for, with the name and address of the successful tenderer in each case, together with the kind, quality and quantity of coal, wood or fresh meat, or any of them tendered for. Also the kind, quality and quantity of either of those items for which tenders were accepted in each case and the prices paid. Also the names and addresses of all parties supplying coal, wood or fresh meats, or either of them, without tender, during the above date at the Brockville Asylum, the kind and quantity by each person supplied and the price paid. Presented to the Legislature, 27th March, 1901. Mr. *Joynt. Not printed.*

No. 74.. Return to an Order of the House, for a Return, of copies of all correspondence between the Government, or any member or official thereof, and the Inspector of Public Schools in the County of Dufferin, or any other party or parties, respecting the refusal to pay over the Gevernment grant to School Section No 7, of the Township of Melancthon, during the last five years. Presented to the Legislature, 2nd April, 1901. Mr. *Barr. Not printed.*

No. 75.. Return to an Order of the House, for a Return shewing: 1. The amount of the bonuses of subsidies voted to Railways by this Legislature, each year, during 1898, 1899 and 1900. 2. The names of each railway and the amount voted to each, during the same period. 3. The amount paid to each railway during each of such years and the condition, or conditions, upon which such payments were made Presented to the Legislature, 4th April, 1901. Mr. *Joynt. Not printed.*

No. 76.. Agreement between His Majesty, represented by the Commissioner of Crown Lands, and the Keewatin Power Company, Limited. Presented to the Legislature, 9th April, 1901. *Printed.*

No. 77.. Return to an Order of the House, for a Return, of copies of all correspondence between the Government, or any member thereof, and the Crown Attorney of Halton, or any other person or persons, with reference to the collection of the fines imposed upon those found guilty of bribery in the last local election in Halton. Presented to the Legislature, 11th April, 1901. Mr. *Wardell. Not printed*

* Printed for Distribution only.

No. 78.. Return to an Order of the House, for a Return shewing: 1. How much money has been spent on Colonization Roads in the last seven years. 2. How many miles have been built during the same period. 3. What was the cost *per* mile, how much paid for labour; how much to overseers and commissioners, and to whom. 4. What amount was paid for surveys during the same period. Presented to the Legislature, 11th April, 1901. Mr. *Brower*. *Printed*.

No. 79.. Return to an Order of the House, for Return of copies of all correspondence and papers between the Government, or any member thereof, or any Inspector of Factories, or Bureau of Labour, and any person or persons, firm or corporation, having reference to the enforcement, or non-enforcement, or the compliance or non-compliance, with the provisions and requirements of the Ontario Factories Act, during the years 1898, 1899 and 1900. Presented to the Legislature, 12th April, 1901. Mr. *Carscallen* *Not printed.*

SEVENTH ANNUAL REPORT

OF THE

FRUIT EXPERIMENT STATIONS

OF

ONTARIO,

UNDER THE JOINT CONTROL OF THE

ONTARIO AGRICULTURAL COLLEGE, GUELPH

AND THE

FRUIT GROWERS' ASSOCIATION OF ONTARIO

1900.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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1901.

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TORONTO.

SEVENTH ANNUAL REPORT

OF THE

ONTARIO FRUIT EXPERIMENT STATIONS

1900.

To the Honorable John Dryden, Minister of Agriculture:

Sir,—We have the honor to submit to you the Seventh Annual Report of the Fruit Experiment Stations of Ontario. Experimental work requires much time to attain valuable results, and now that varieties planted at our various stations are beginning to produce fruit, our reports will become increasingly valuable year after year. You will observe that this report is much more adapted to guide the planter than any previous one.

We have the honor to be, Sir,

Your obedient servants,

Jas. Mills, M.A., LL.D., Chairman.
Linus Woolverton, Secretary.

BOARD OF CONTROL, 1901.

REPRESENTING THE COLLEGE.

JAMES MILLS, M.A., LL.D. ..... Guelph.
H. L. HUTT, B.S.A. ..... Guelph.

REPRESENTING THE ONTARIO FRUIT GROWERS' ASSOCIATION.

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W. M. ORR ..... Fruitland.
WELLINGTON BOULTER ..... Picton.
LINUS WOOLVERTON, M.A., *ex-officio* ..... Grimsby.

EXECUTIVE COMMITTEE.

Chairman—JAMES MILLS, M.A., LL.D.
Secretary—LINUS WOOLVERTON, M.A.
Official Visitor—H. L. HUTT, B.S.A.

THE ONTARIO FRUIT EXPERIMENT STATIONS.

	Name.	*Specialty.*	*Experimenter.*
1.	Southwestern	Peaches	W. W. HILBORN, Leamington.
2.	Niagara		
3.	Wentworth	Grapes	M. PETTIT, Winona.
4.	Burlington	Blackberries and Currants	A. W. PEART, Freeman.
5.	Lake Huron	Raspberries	A. E. SHERRINGTON, Walkerton.
6.	Georgian Bay	Plums	J. G. MITCHELL, Clarksburg
7.	Simcoe	Hardy Apples and Hardy Cherries.	G. C. CASTON, Craighurst.
8.	East Central	Pears and Commercial Apples	R. L. HUGGARD, Whitby.
9.	Bay of Quinte	Apples	W. H. DEMPSEY Trenton.
10.	St. Lawrence	Hardy Plums and Hardy Pears	H. JONES, Maitland.
11.	Strawberry station		E. B STEVENSON, Guelph.
12.	Gooseberry station		S. SPILLETT, Nantyr.
13.	Algoma	Hardy Fruits	CHAS. YOUNG, Richard's Landing.
14.	Wabigoon	Hardy Fruits	A. E. ANNIS, Dryden.
	Maplehurst	General collection of all kinds of fruits for descriptive work for "Fruits of Ontario"	L. WOOLVERTON, Secretary.

FRUITS OF ONTARIO.

DESCRIBED AND ILLUSTRATED BY MR. L. WOOLVERTON, SECRETARY OF THE ONTARIO FRUIT EXPERIMENT STATIONS.

1900.

Fruit growing has become so important an industry in the Province of Ontario, that it deserves every encouragement at the hands of the Department of Agriculture. The Canadian farmer who contemplates growing fruit asks for information on two points in particular, viz., (1) What fruits shall I plant, and (2) how shall I cultivate them? The latter of these questions it is the province of the Ontario Fruit Growers' Association to answer through the Canadian Horticulturist and the Annual Report, while the former question is one that can be solved only by years of patient experimental work by our fruit experiment stations.

Of equal importance is some means of identifying all varieties now grown in our Province, and of knowing with some degree of exactness the size, color, general appearance and real value of these varieties aside from the catalogues of the nurserymen. To meet this latter need, the Secretary, with the advice and approval of the Board of Control, has begun the work of illustrating and describing the fruits of Ontario, and in this work he desires to acknowledge the valuable aid of the various fruit experimenters. The illustrations are all new and original, having been engraved from photographs made the exact size of the fruit samples, except where otherwise specified, and in this way there will in time be made accessible to the Ontario fruit growers a complete guide to all the fruit grown in the Province. Such a work necessarily must be slow and tedious, but it is all important that it should be characterized by scientific accuracy and the writer invites notes of criticism from pomologists generally.

Apple Packing at Maplehurst.

APPLES.

*MANN.

The Mann apple is not very highly recommended for extended orchard planting in Ontario, because of its rather unattractive green color in shipping season in October. The tree has the merit of being a productive variety and an early bearer, but the fruit is inclined to drop early, and to be small, when not thinned.

MANN.

ORIGIN, New York State, a chance seedling

TREE, hardy, vigorous, spreading, with slender branches; an early and regular bearer, inclined to overload

FRUIT, of large size when thinned and well cultivated, $2\frac{3}{4} \times 3\frac{3}{4}$ inches; form, roundish, oblate, regular; skin, dull green, yellowing at maturity, nearly covered with light green dots; stalk half an inch long in a large slightly russeted cavity: calyx closed in a large plaited basin.

FLESH, yellowish, moderately firm, juicy, agreeable, sub-acid. SEASON, January to April.

SECTION OF MANN.

QUALITY, desert poor; cooking good.

VALUE. Good for home or foreign market, but its color is not favorable for best prices.

* Engravings of Mann and Spy are given correctly in this issue, because in our report for 1898 they were transposed by mistake.—ED.

PRINCESS LOUISE.

(Woolverton.)

An apple of great value for the home garden as a choice dessert variety, but probably not sufficiently productive to be profitable in the commercial orchard unless it should command a higher price than other apples on account of its excellence.

THE LOUISE.

ORIGIN, at Maplehurst, near Grimsby ; a chance seedling of the Snow. Samples were first exhibited by Mr. L. Woolverton at a meeting of the Ontario Fruit Growers' Association at Hamilton, where it was given the name Princess Louise, after Her Royal Highness, wife of the Governor-General, His Excellency the Marquis of Lorne.

TREE, of slender habit, fairly vigorous, hardy, moderately productive.

FRUIT, roundish, averaging $2\frac{3}{4}$ by $2\frac{1}{4}$ in length and breadth respectively ; skin, greenish yellow, of bright waxy lustre, with cheek of clear bright carmine ; stem, stout, $\frac{3}{4}$ inch long, in a narrow, moderately deep cavity ; calyx, half open, in a broad, shallow, slightly plaited basin.

FLESH, pure white, texture tender, fine, somewhat crisp, juicy with rich aromatic flavor.

SEASON, November to February.

QUALITY, dessert, best ; cooking, fair.

VALUE, home market, very good.

SECTION OF LOUISE.

SPY. (*Northern Spy.*)

The Spy stands in the very first rank of Canadian apples, whether for home or foreign markets. Originating in New York State on the line with the southern portion of the Province of Ontario, it succeeds here to perfection. Its beauty of coloring, half shaded by its delicate bloom, and its great excellence of quality for all purposes, justly claim for it its wide popularity. In Chicago, Canadian Spys are more sought for than any other variety, but, owing to tenderness of skin, which shows the slightest bruise, it is less popular for export to Great Britain than some other varieties. The tree is late in coming into bearing, often being fifteen years planted before yielding a crop, and this renders the variety somewhat unpopular with planters. Probably for fancy packages, selected Spys would be among the best.

SPY.

ORIGIN, near Rochester, N.Y.

TREE, upright and spreading in habit; fruit spurs on interior boughs very vigorous, late in coming into bearing, but afterwards fairly productive in alternate years; blossoms late in spring and holds its fruit late in the autumn; requires high cultivation and good fertility.

FRUIT, large to very large; form, roundish, slightly conical; skin, thin, light green, or pale yellow, sprinkled with light pink, striped and shaded with pinkish red, and thinly covered with thin whitish bloom; stalk, slender, three-quarters of an inch long, in a wide, deep, sometimes russeted cavity; calyx, small, closed, in a narrow, moderately deep, abrupt, irregular basin.

FLESH, white, fine grained, crisp, tender juicy; flavor, rich, sprightly, subacid, fragrant.

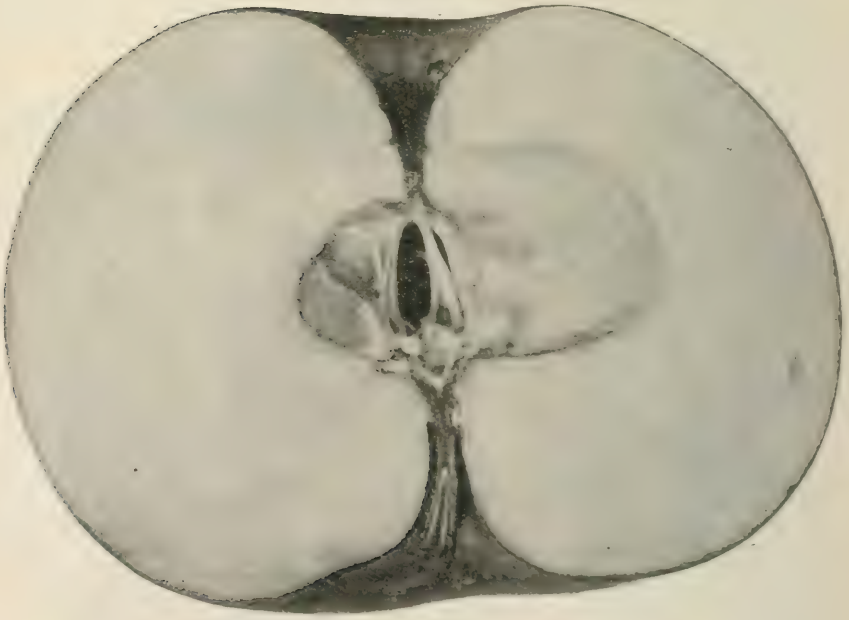
SEASON, January to May.

QUALITY, dessert and cooking, first-class; home market, first-class; a little tender for distant shipments.

SECTION OF SPY.

ADAPTATION, sandy or clay loams in southern and middle Ontario; found tender at Simcoe Experiment Station and at the St. Lawrence Experiment Station.

Wolf River.



Section of the Wolf River.

WOLF RIVER.

The Wolf River is an apple that might be included in a list for export. It is a little later in season than Alexander, and promises well as one of our fancy varieties for export.

It is a seedling of the Alexander, and originated in Wisconsin on the bank of Wolf river.

TREE, very hardy, vigorous and fairly productive; an early bearer.

FRUIT, very large, 3 inches by 4½ inches, oblate, or roundish oblate usually regular in size; skin light yellow, shaded with dark red or crimson in sun, with a few yellowish dots: stem, three-quarters of an inch long, set in a narrow deep basin, of a green or russeted color: calyx, open, in a narrow, deep, green wrinkled basin.

FLESH, yellowish white, moderately firm in texture, not fine-grained, juicy, with a pleasant sub-acid, spicy flavor.

SEASON, October and November.

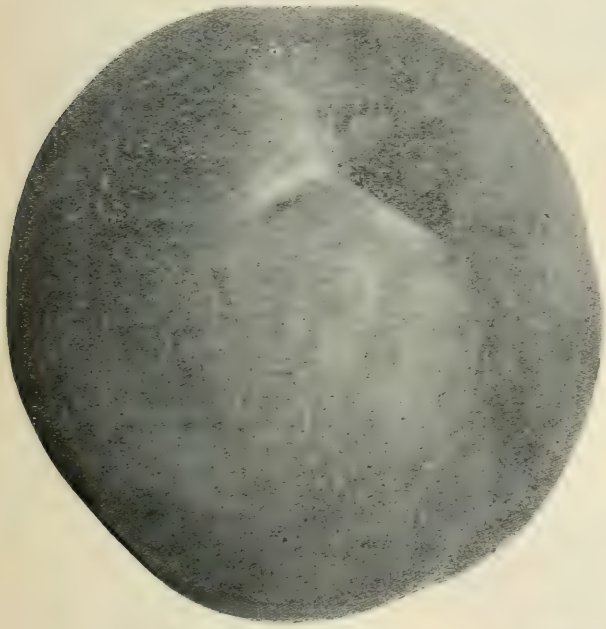
PEACHES.

ELBERTA.

The best peach of its season for all markets, and a variety especially suited for export by reason of its shipping qualities.

ORIGIN, Georgia; a cross between Chinese Cling and Crawford's Early.

TREE, vigorous, hardy, and moderately productive, carrying as much fruit as a tree should, and if it were a heavier cropper the fruit would need thinning. The leaves are much subject to curl leaf, but this may be largely controlled by spraying.



THE ELBERTA PEACH.

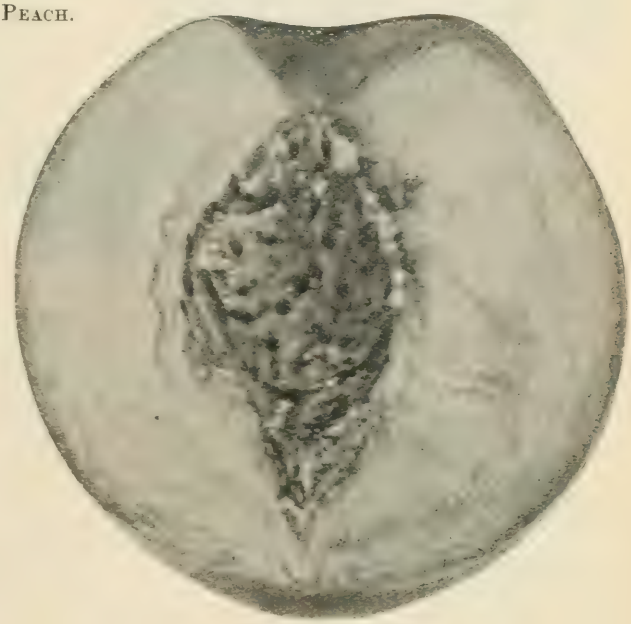
FRUIT, medium to large, 3 x 3 inches, roundish oval, one side somewhat larger than the other, suture distinct; skin, lemon yellow, with a fine red cheek; stone free, deeply corrugated, pointed.

FLESH, yellow, tender, juicy, melting; flavour, rich, agreeable and very good.

SEASON, September 20th to 25th, about a week later than Crawford's Early.

QUALITY, dessert, very good; cooking, best.

VALUE, home market, very good; foreign market, best.



SECTION OF ELBERTA.

BLACKBERRIES.

THE KITTATINNY.

This has been the favorite blackberry in Ontario for both home use and market. Formerly the Lawton was our principal market berry, but though it turned black enough to sell on the market its hard core never seemed ripe enough for eating. It was therefore an agreeable change to grow the Kittatinny, with its large shining black berries, ripe through and through, and most excellent, either for eating fresh or with sugar and cream at the table, or in pies.

Unfortunately, it is very subject to Orange Rust, for which as yet there is no remedy, and in most places fruit growers have given up this variety on account of it.

ORIGIN, Kittatinny Mountains, N.J.; found growing wild by a Mr. Woolverton in 1874 but not much desseminated until many years later.

PLANT, very vigorous, but tender outside of the peach belt productive; propagated by suckers, and by root cuttings; very susceptible to the Orange Rust.

BERRY, large averaging about 1½ inches in length; oblong, slightly conical; shiny black when ripe, becoming gradually duller after gathering; flesh, moderately firm, sweet, rich and excellent.

THE KITTATINNY.

SEASON, July 25th to August 25th.

QUALITY, Good for dessert; very good for cooking.

VALUE, First-class for home market.

CURRANTS.

BLACK VICTORIA.

BLACK VICTORIA.

An early black.

BUSH, upright, of medium vigor, healthy, hardy and productive.

BERRY, large, half inch, firm, sweet.

QUALITY, fine.

SEASON, July 10th to August 5th.

BELLE DE ST. GILES.

Supposed by some to be the same as Red Dutch, but as we have grown it, larger berries and finer bunches. It is a large berry of fine quality, but not productive enough for the commercial plantation.

ORIGIN, Europe.

BUSH, upright, spreading; vigor, medium; hardy, not very productive.

BUNCH, large and compact.

BERRY, red, large, half-inch diameter; sub-acid; quality excellent.

SEASON, medium, July 8th to August 1st.

BELLE DE ST. GILES.

BRAYLEY.

ORIGIN,—

BUSH, upright, spreading, vigorous, healthy, hardy and productive.

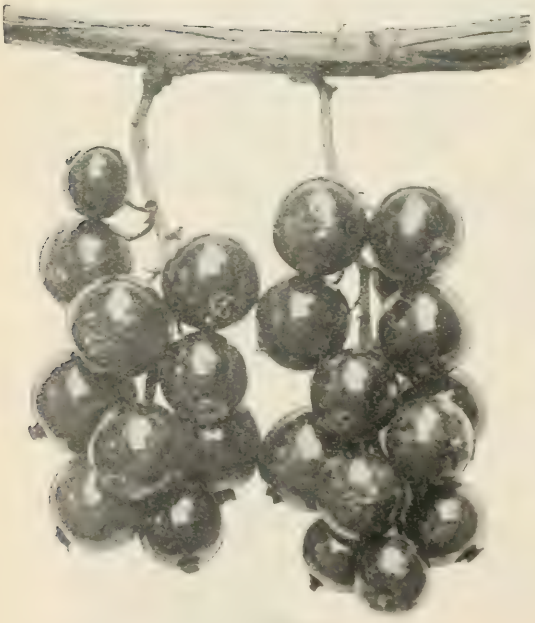
BUNCH, long, straggling, loose.

SEASON, medium, July 10th to August 1st.

BRAYLEY.

CHERRY.

(*Red Imperial., Fertile d'Angers*—"*LeRoy.*")



The principal red currant grown in Southern Ontario for commercial purposes. Its large size, fine color and earliness, combine to make it the most satisfactory of all varieties for market, and many acres have been set out for this purpose. When well cultivated and well pruned back, a plantation of Cherry currants will continue very productive for at least twelve or fifteen years.

ORIGIN, Europe.

PLANT, vigorous, a stout stocky grower; productive; begins bearing the second year after planting; foliage thick, dark green.

BUNCH, usually short, but sometimes long and tapering; average length, two inches.

BERRY, very large, globular, ½ inch in diameter; bright red in color; acid.

SEASON, June 26th to July 25th.

QUALITY, fair.

CHERRY.

VALUE, first-class for market and for jellies.

ADAPTATION, general, but succeeds better on clay loam than upon light sand.

CRANDALL.

This interesting currant is of very doubtful value for the currant plantation, for it ripens so unevenly and its culinary uses seem not well defined.

ORIGIN Kansas.

BUSH, upright, spreading, hardy, healthy, vigorous, rampant and very productive.

CRANDALL.

BERRY, variable in size, diameter $\frac{3}{8}$ to $\frac{3}{4}$ inch ; bluish black ; flavor, sprightly sub-acid.

SEASON, July 15th to September 1st.

It is of the Ribes aureum type, or flowering currant, and was produced from seed of that variety by Mr. Crandall.

FAY.

A variety that has been much advertised as superior to the Cherry, but, as a matter of fact, is very similar in fruit and in productiveness.

ORIGIN, New York State.

BUSH, vigorous, but sprawling, and somewhat subject to the borer where the shoots are not frequently renewed.

BUNCH, moderately close, loose toward the base; length 2 to 3½ inches.

BERRY, very large, globular, ½ inch in diameter; bright red; juice, sub-acid.

QUALITY, good.

SEASON, June 25th to July 25th.

VALUE, first-class for market.

ADAPTATION, General.

FAY.

LEE'S PROLIFIC.

LEE'S PROLIFIC.

A good commercial variety.

ORIGIN, England.

BUSH, moderately vigorous, healthy, hardy and very productive.

BERRY, black, very large, ½ inch to ⅝ inch; flavor, sub-acid; quality, very good.

SEASON, July 15th to August 10th (in 1900.)

HOLLAND.

HOLLAND.

White Holland, Long Bunched Holland.

The best bunched and the most showy of the white currants.

BUSH, vigorous, healthy and quite productive.

BUNCH, four to five inches in length; loose at base of racemes, close toward apex.

BERRY, $\frac{3}{8}$ inch long by $\frac{1}{2}$ inch broad; globular; skin, thick, white; flavor, mild acid.

SEASON, July 10th to 30th.

LONDON.

(London Market.)

One of the most promising of the new varieties for all purposes.

ORIGIN, England.

BUSH, very vigorous and healthy, not as subject to leaf spot and twig borer as some other varieties, very productive.

BUNCH, about three inches long, comparatively compact.

BERRY, $\frac{1}{2}$ inch, in diameter, color red, quality fair.

VALUE, very good for both kitchen and market.

SEASON, middle of July to middle of August.

LONDON.

MIDDLESEX,

(*Saunders No. 12.*)

Among a collection of seedling black currants sent to Maplehurst by Dr. Saunders of Ottawa in 1896, we notice one which gives promise of greater productiveness than the others. Not only are the berries a good size, but, what is of greater importance with a black currant, the bunches are full and hang pretty closely along the branch. This is now known as the Middlesex.

ORIGIN, Dr. Saunders, Ottawa, Canada.

BUSH, very vigorous, healthy, very productive for three successive years, viz., 1896, 1897 1898.

BUNCHES, about 1¼ inches in length, compact.

BERRY, round, about half an inch in either diameter ; skin, jet black, thick ; flavor, good.

SEASON, July 8th to 16th, or later in Southern Ontario.

VALUE, first-class for cooking and market.

ADAPTATION, general.

MIDDLESEX. (Slightly reduced).

NAPLES.

NAPLES.

One of the best market varieties of black currants.

ORIGIN, Europe.

BUSH, upright, strong, vigorous, hardy, healthy and very productive.

BERRY, large, ½ inch in diameter, black, sub-acid, quality good.

SEASON, July 12th to August 12 in 1900.

NEW VICTORIA.

ORIGIN—

BUSH—upright, spreading, vigorous, hardy, but not very productive.

BUNCH—long, loose.

BERRY—red, small to medium, average size $\frac{3}{8}$ of inch, flavor pleasant.

SEASON—medium, July 9 to August 1.

NEW VICTORIA

NORTH STAR.

NORTH STAR.

We have tried this variety since 1896 at Grimsby, and at first were inclined to condemn it as too small, but it has grown in favor each year, until, in 1899, it has surpassed most varieties in productiveness, in health and vigor of bush, and in keeping qualities. At date of writing, August 20th, the fruit still hangs as bright in appearance as it was a month ago. Possibly it would pay currant growers to hold the fruit for the latest market, for in the height of the currant season, the price is often very low.

ORIGIN, Minnesota.

BUSH, vigorous, healthy, very productive.

BUNCH, compact, three to four inches long, inclusive of about an inch of naked stem, which is convenient in gathering.

BERRY, round, $\frac{3}{8}$ inches in diameter; skin, thin, bright red; subacid.

QUALITY, cooking very good.

VALUE, second rate on account of size, but, season and productiveness considered, it might be classed first rate.

SEASON, July 15 to September 1.
Adaptation, general.

RED CROSS.

RED CROSS.

Very much resembles Cherry, but somewhat poorer in bunch.

ORIGIN, New York State, probably a cross between the Cherry and the White Grape.

BUSH, upright, vigorous and fairly productive.

BUNCH, $2\frac{1}{4}$ inches long, $\frac{3}{4}$ inch of which is naked stem, compact.

BERRY, $\frac{1}{2}$ inch, round, bright red, flavor fairly good, agreeably acid.

SEASON, last half of July.

VERSAILLAISE.

This variety closely resembles Cherry.

ORIGIN, France.

BUSH, healthy, hardy, fairly vigorous and fairly productive.

BUNCH, medium, length $2\frac{1}{2}$ inches, and moderately compact.

BERRY, round, $\frac{1}{2}$ inch diameter, bright red, milder in flavor than the Cherry.

SEASON, July 7th to August 1st.

Valuable for market.

VERSAILLAISE.

WHITE IMPERIAL.

WHITE IMPERIAL.

ORIGIN, —

BUSH, vigorous, hardy, healthy and fairly productive.

BUNCH, loose, 2¼ inches long, with half an inch of stem.

BERRY, white, diameter 7-16 of an inch; flavor, mild; quality fine.

VALUE, dessert very good.

SEASON, at Burlington Station, July 8th to August 1st.

WILDER.

WILDER.

This is one of the best of the red currants and has given an excellent record at our Burlington station. It is highly recommended in the recent report of the American Pomological Society.

ORIGIN, New York State, named in honor of the late Marshall P. Wilder.

BUSH, healthy, hardy and very productive.

BUNCH, four inches in length, with one inch of stem, compact.

BERRY dull red, form uneven, diameter half inch, mild in flavor, of good quality.

SEASON, July 8th to August 1st.

VALUE, first-class for market.

RED DUTCH.

Too small for the commercial plantation, but of fine flavor for dessert.

ORIGIN, Europe.

BUSH, dwarfish, slender, hardy and productive.

BUNCH, medium, $2\frac{1}{2}$ inches long, with $\frac{1}{2}$ inch naked stem, compact.

BERRY, small, $\frac{1}{3}$ to $\frac{3}{8}$ inch, oblate, red; flavor, sprightly, sub-acid, pleasant.

VALUE, second rate for market.

SEASON, July.

WHITE GRAPE.

(WhiteAntwerp-WhiteTransparent)

This is esteemed the finest of all the white currants, when its many good points are taken into consideration, viz., quality, beauty and productiveness. For market, its white color is against it, but for the home garden in is one of the best.

ORIGIN, Europe.

BUSH, moderately vigorous, very productive.

BUNCH, $2\frac{1}{2}$ to 3 inches long, somewhat straggling.

BERRY, $\frac{7}{16}$ to $\frac{9}{16}$ of an inch in diameter, skin white, transparent, flavor mild acid, sprightly, agreeable.

VALUE, best for dessert, fair for market.

SEASON, July 15th to Aug. 10th.

NOTE.—The single bunches were grown at the Burlington Station, and the clusters by Prof. Hutt at the O.A.C., Guelph.

WHITE GRAPE.

White Grape Currant.

Grapes.

THE EARLY VICTOR.

The Early Victor Grape colors very early, fully two weeks ahead of Concord, and is fit to gather about ten days before, along with Hartford and Moore's Early.

The early Victor was originated by John Burr, of Leavenworth, Kansas, in 1870. A seedling of the Delaware.

THE EARLY VICTOR GRAPE.

Vine—Very vigorous, very productive and healthy.

Bunch—4 inches long by 3½ broad, shouldered and very compact.

Berry—Medium, round, black, with thick blue bloom, adheres well, pulp tender, juicy, sweet and agreeable ; seeds, two.

Season—August 25th (1899), and since it ripens so early is worthy of trial in northern sections.

Quality—Very good for dessert.

Value—Good for home market ; also very good for making claret wine.

FRUIT EXPERIMENT STATIONS.

BOARD MEETINGS.

The Board of Control met at the Railway Committee Rooms, Parliament Buildings, Toronto, on the 6th of March, 1900, when a resolution was passed urging that experiments be continued in the export of Canadian Rogers' grapes. It was further resolved to purchase such stock as was necessary to fully restock the stations in room of all vacancies. It was estimated that $2,600 would be required for our work during the year 1900.

On the 3rd of July, a meeting was held at the office of the Secretary. The morning was spent in inspecting the cherry, plum, peach, pear and grape plots, after which the meeting came to order for work. In the matter of the Industrial Fair, it was ordered that the exhibit should be set up in alphabetical order, and that only valuable varieties be shown in the collection. The experimenters are to set on one side those varieties which they have tested and found valueless.

The importance of the Pan-American Exposition was fully discussed, and the Secretary ordered to communicate with the Hon. John Dryden, Minister of Agriculture, giving him the views of this Board upon the importance of making a first-class exhibit of apples and other fruits at that Exposition, and that a fine collection of winter apples be placed in cold storage at Buffalo to go on the tables in the early summer.

On the 2nd of January, 1901, a meeting was held at the House of Parliament, Toronto, at which the estimates were considered, and it was decided to ask about the same amount for our work as has been allowed in previous years.

It was ordered that this Board recommend to the Minister of Agriculture the importance of an early decision with regard to the extent of the fruit exhibit at the Pan-American, and with regard to the superintendance of the same.

REPORT ON THE INSPECTION OF THE FRUIT EXPERIMENT STATIONS.

By Prof. H. L Hutt, Ontario Agricultural College, Guelph.

I have the honor to present herewith a brief report on my inspection of the Fruit Experiment Stations last summer. I am pleased to state that on the whole good progress is being made. The experimenters have taken great interest in the work from the start, and most of them are now in a position to give valuable information upon a large number of varieties of the different kinds of fruits they have under test. In the following notes the stations are mentioned in the order they were visited during the summer.

The Gooseberry Sub-Station, Nantyr.—Visited July 12th. Mr. Spillett has about two dozen varieties of gooseberries under test, most of which have been out four or five years. Red Jacket, Pearl and Downing have proved to be the most satisfactory varieties and are free from mildew. Most of the other varieties have mildewed more or less badly in spite of repeated sprayings with Bordeaux mixture, particularly on heavy soils, while the few on the light soils have escaped altogether. Of the English varieties, Green Chisel is the most promising. The bushes are small, but they are well loaded with beautiful large berries, quite free of mildew. Nearly all of his old bushes are mound layered to make plants for another year. Mr. Spillett is taking good care of his bushes, and they are well pruned, sprayed and cultivated.

The Simcoe Station, Craighurst.—Visited July 13th. This section of the country has had plenty of showers, and nearly all of the crops and fruits are looking well. Mr. Caston has an extensive collection of apples, pears, plums, cherries, and small fruits, all of which are well cultivated, pruned and sprayed. Some of the Japan plums, such as Wickson, have proven tender in this section.

There is only a fair crop of winter apples, as last year was the bearing year in his orchard. Of the Duchess, however, there is a grand crop, and Mr. Caston will probably have 100 barrels of this variety. Flemish Beauty pears are promising, although some of them are showing signs of scab. Cherry trees blossomed well in the spring but did not set fruit, and plums also will give little or no fruit this year. Russian Apricots have been wintered through for a number of years, and although they seem hardy enough and bloom freely, they have never yet borne fruit, possibly on account of frost injuring the early blossoms. Of the small fruits, raspberries, currants, gooseberries and blackberries, there is a fine crop. Strawberries also were a good crop, although the yield was somewhat lessened by early drought. For all of these fruits, Mr. Caston has a good local market and can sell much more than he can produce. He is planting more largely of the blackberries, of which Snyder and Agawam have proven the most hardy. Good work is being done at this station, and, as evidence of the confidence which the people of that neighborhood have in the results obtained, a number of the nursery agents have come to Mr. Caston to get him to mark the list of varieties which he would recommend for that section. This we consider one of the most practical results of the work of the station.

The Huron Station, Walkerton.—Visited July 17th. Mr. Sherrington has been testing a large number of varieties of raspberries, for a number of years and he is now ready to discard a great many of them and confine his attention to a few of the best. Cuthbert he finds to be still the most satisfactory of the reds, while Hilborn and Conrath have made the best showing among the blacks. For all of these fruits he has a good local market, and can sell at good prices much more than he is producing. The experimental trees of plums and cherries set out three years ago have made a fine growth and some of them began bearing last year. There will be little or no fruit on any of them, however, this year.

In his apple orchard Mr. Sherrington has a fair crop, although not nearly so large as last year, that being the bearing year. Mr. Sherrington's place is well managed, and his trees and plants receive good care.

Burlington Station, Burlington.—Visited July 24th. In previous reports I have referred to the fine collection of fruits growing at this station and the excellent work being done. This season the crop of nearly all kind of fruits, with the exception of plums, was all that could be desired. Mr. Peart has been giving special attention to raspberries, currants and blackberries and has given carefully prepared notes on these in his annual reports. Of the red currants he finds the Cherry and Wilder most satisfactory, while the Collins' Prolific has proven to be the best black, and White Grape the best white currant. In raspberries, the Marlborough, Cuthbert, Miller and Louden are the best red varieties to date. Kansas has made the best showing among the blacks. Among the blackberries, Mr. Peart finds Western Triumph, Agawam and Kittatinny the leading varieties so far.

A fuller account of all these fruits under test will be found in his annual report Mr. Peart is also making a number of experiments with commercial fertilizers on various kinds of soils, and for different fruits, and will be able to give some valuable data on these in the course of a year or two.

The Southwestern Station, Leamington.—Visited August 1st. During the severe winter of 1898-99 over 90 per cent. of the peach trees in this section of the country were destroyed. Plums suffered nearly as much ; and many other trees, such as pears and cherries, were also severely injured. Where ever trees escaped it was mostly on moist land or where the ground was covered with weeds or a cover crop. The most of the peach trees saved on Mr. Hilborn's place were in the experimental plots where there are now about 100 trees of 25 or 30 kinds fruiting this season. Mr. Hilborn is in no way discouraged but is planting again as quickly as possible and has about 80 acres re-planted. In the experimental plots he has a good collection of varieties started again.

The past season has been showery and favorable for newly planted trees, but many of these have failed or made a sickly growth. Whether this can be attributed to the injury of fumigagation, as is supposed by some, or whether it is due to the weakly stock planted, is hard to say, but it is quite noticeable that the young trees from some of the American nurseries have made much better growth than those from our home nurseries. Mr. Hilborn has a good collection of Japan plums, many of which are now coming into bearing and are quite promising, particularly some of Burbank's new seedlings. As a side line Mr. Hilborn has gone quite extensively into the growing of gladioli, and he hopes in time to work up a profitable trade in that class of ornamentals, his soil being very suitable for the production of the bulbs.

Wabigoon Station, Rainy River District.—Visited August 21st, 1900. A year ago last spring a few of the hardy apples, plums, pears, cherries and small fruits were sent to this station for the purpose of finding out what fruits could be grown in this northern section. Nearly all of the trees perished last winter, when it was unusually cold with but little or no snow on the ground. Among the small fruits the black currants have stood the best, while the red and white varieties have done poorly. The Downing gooseberry has made a fair growth but the Whitesmith and Industry have failed or made no progress. The black and purple raspberries have not been tried, but the red varieties, such as Marlboro', Miller, Loudon and Turner have made a good growth this season, although the tops were frozen nearly to the ground last winter.

The comparatively poor showing that the fruits have made here so far may be attributed to several causes—the severity of the weather, the lack of protection from drying winds and probably also the impervious nature of the subsoil where they have been planted. There is a much more suitable soil for fruits a little further east from the house which Mr. Annis says might be used for this work, and we would recommend that another small collection be sent for planting next spring made up as follows :

Apples, 10 varieties, 2 trees of each—Duchess, Wealthy, Longfield, Whitney, Transcendent, Hibernal, Melinda, Anassim, Arabka and Charlamoff.

American Plums, 10 varieties, 2 trees of each—Aitkin, Cheny, Hawkeye, Hunt, Stoddard, Rollingstone, Wolf, Forest Garden, De Soto and Wyant.

Cherries, 4 varieties, 2 trees of each—Koslov Morello, Orel, Olivet and Early Richmond.

Currants, 4 varieties, 6 bushes of each—Fay, Cherry, Victoria and White Grape.

Gooseberries, 3 varieties, 6 bushes of each—Pearl, Downing and Red Jacket.

Raspberries, 4 varieties, 12 plants of each—Cuthbert, Golden Queen, Columbian and Older.

STRAWBERRIES, 4 varieties, 50 plants of each—Van Deman, Clyde, Saunders and Haverland.

THE ALGOMA STATION, RICHARD'S LANDING.—Visited August 24th. The progress made at this station has been remarkable and nearly all of the trees and plants sent for testing have lived and made a fine growth. About the only failures at all were among some of the Japan plums, which could hardly have been expected to stand the winter in this northern section, although some of the Japan varieties have come through the winter uninjured. In one case we noticed where the top had been frozen back, there was a strong growth from the root upon which the plum had been worked, which in this case happened to the peach. There is little danger of root killing in this district where the ground is usually covered with a deep snow for the whole winter.

Mr. Young has now a fine collection of fruits well started and some interesting results may be expected from this station in the near future.

THE GEORGIAN BAY STATION, CLARKSBURG.—Visited August 27th. At this station may be seen one of the finest collections of plums in the country but the crop this year is a total failure which Mr. Mitchell thinks was due to the unusually warm weather in February, when the buds were forced into growth and afterwards checked by severe weather. All of the trees, however, are vigorous and thrifty and promise well for a crop next year.

In the apple orchard there is a fair crop of fruit this year of most varieties such kinds as Ben Davis, Greening, Pewaukee and St. Lawrence being particularly well loaded. Many of the Northern Spys are also bearing a good crop. We noticed also a few trees of Flemish Beauty pears which would probably be 18 or 20 feet in height which were loaded with fine fruit. Last year Mr. Mitchell had a fine crop of pears off his orchard of dwarf varieties, among which are the Duchess, Anjou, Clapp, Goodale, etc.

There may also be seen at this station quite a number of peach trees which have not yet showed any signs of injury from winter killing. Some of them were fruiting this year. Mr. Mitchell is a thorough cultivator and his trees show that they have received good attention. Notwithstanding the severe drought for the greater part of the season, the cultivation given had retained the soil moisture and the trees showed but little injury from the drought.

THE EAST CENTRAL STATION, WHITBY.—Visited August 30th. Most of the apple and pear trees set out at this station were planted during 1896-97, and quite a number of them are now beginning to bear. In the older trees there is a goodcrop of fruit, but plums are a failure, as in most other sections this year.

Mr. Huggard does not allow his ground to stand idle, and has been cropping freely between the rows with hoed crops, such as corn, roots and potatoes, although he has hardly been careful enough to keep these from encroaching upon the trees. The cultivation given has stimulated a strong growth, necessitating the heading back of upright kinds, such as pears and plums. This has been somewhat neglected in the past, although Mr. Huggard now sees the necessity for it since the older trees have come into bearing. All of the trees have been sprayed three or four times and are fairly free of insects and fungous diseases.

THE BAY OF QUINTE STATION, TRENTON.—Visited September 1st. Mr. Dempsey's orchard is well cultivated and thoroughly sprayed; and this year he has a fair crop on his bearing trees which he expects will yield about 2,000 barrels. The fruit is somewhat undersized because of the extreme drouth, but all of the apples are clean and free from worms and scab. The young trees set out in the experimental orchard in 1896 have done well, and several are this year bearing fruit One of these, Western Beauty, is loaded with fine large apples, much like Wealthy in appearance. Many of the scions grafted on bearing trees during the past three or four years are now bearing, and fruit from many of these was shown this year at the Toronto Exhibition.

Mr. Dempsey has in all about 170 varieties of apples in bearing, 100 of which were shown this year at Toronto. Valuable reports are now being received from this station.

THE ST. LAWRENCE STATION, MAITLAND.—Visited September 3rd. The soil upon which Mr. Jones has planted his experimental orchard is a deep, rich, black, sandy loam and most of the trees have made a remarkable growth, some of the new growths measuring five and six feet in length. Most of the kinds planted have done well and are now beginning to show signs of fruiting. Some varieties show signs of being worthless for this section and have been injured by sun scald. In the young orchard, planted in 1896, there will no doubt be many kinds of apples, pears, and plums in fruiting next year. In Mr. Jones' bearing orchard he has his usual fine crop of Snows and Scarlet Pippins. The fruit is of good size and free from scab and worms. In this section they have not had the severe drought which has so reduced the crop farther west. From this orchard of four acres, Mr. Jones has sold fruit during the past three years to the value of $3,682. Last year his crop was about 500 barrels, which brought him in round figures $1,300 The crop this year will be quite as heavy. These facts alone speak for the care and attention which the trees at this station receive.

THE NIAGARA STATION, ST. CATHARINES.—Visited September 13th. Mr. Burrell has sold out his fruit farm and removed to British Columbia. Since his removal, the experimental plots of peaches and tender fruits had been planted with corn and were sadly neglected. A number of

the trees had been killed during the past two winters, and were torn out without saving the labels, and there is no record of the trees left. This station has therefore been discontinued.

Maplehurst.—Visited July 2nd and September 14th. The fruit to which Mr. Woolverton has been asked by our board to give special attention is the cherry. He has now in his collection 62 varieties, and most of these being planted five years ago are now coming nicely into bearing. The orchard is on dry sandy loam, which is well cultivated and has been fertilized with wood ashes.

There is a great difference in the habit of growth of the different varieties of cherries, but all look thrifty and vigorous, and some of the sweet varieties have made remarkable growth. At the time of our first visit in July, most of the trees were loaded with fruit, and they presented a sight well worth going to see. An excellent illustrated article on the trees and fruits in this orchard was given in the August number of the *Canadian Horticulturist*, and a full report on the different varieties will appear in Mr. Woolverton's annual report.

Mr. Woolverton has also an extensive collection of grapes, pears, apricots, apples, peaches, European and Japanese plums, and tender fruits, and since we need look for no more reports from Mr. Burrell, I have thought it might be well to ask Mr. Woolverton to report also upon peaches, plums, and the tender fruits in the Niagara District. In all, Mr. Woolverton has now over 600 varieties of fruits, for purposes of study in connection with the preparation of the work assigned him by this Board, viz. : "The Fruits of Ontario," described and illustrated.

The Wentworth Station, Winona.—Visited September 14th, 1900. During the last six years, 150 varieties of grapes have been planted at this station. All have been trellised and are well cared for. Since they have come into bearing, Mr. Pettit has had a good opportunity of studying the varieties, and has found that many of them have not been sent true to name, and out of the whole lot there are but few new ones of value for commercial planting. Mr. Pettit says that eight or ten varieties at the most would be all that are worthy of a more extended trial. We would suggest, therefore, that those varieties which are of little or no value be grafted with some of the better kinds and thus save Mr. Pettit the expense of continuing the work with varieties known to be useless. In a new vineyard set out last spring, Mr. Pettit considered it advisable to plant only such old standards as Agawam, Lindley, Wilder, etc.

There are at this station also about 40 varieties of plums, set out in 1894, which have made fine growth and are now nicely into bearing. A full account of these and of the grapes will appear in Mr. Pettit's annual report.

The Strawberry Sub-station, Guelph.—Visited Oct. 5th, 1900. Mr. Stevenson grows most of his plants at Guelph, where he has many kinds under test. He has made the strawberry a life study, and makes it a point to try nearly every new variety as soon as plants of it can be obtained. He is therefore up to date on strawberry matters, and probably more familiar with the hundreds of varieties of strawberries than any other man in Canada. His annual reports are always full of valuable notes for strawberry growers.

It was ordered that Prof. Hutt's recommendation regarding the Niagara Station for tender fruits be adopted, inasmuch as nearly all these varieties are growing on the grounds of the Secretary.

Ordered, that the experimenters be asked to eradicate varieties tested and proved useless, after reporting upon the same and obtaining the consent of the Board.

Ordered, that the exhibit to be made this season at the Industrial consist of only the most desirable varieties of each fruit, and that inferior varieties be not placed on the table by experimenters.

At this meeting there was also presented the reports from these various stations giving in detail the results of the work of the year. Every year these reports will be of increasing value to Ontario fruit growers, as the varieties planted begin bearing, the object being to guard them against purchasing new and much lauded varieties which, upon trial, prove to be worthless, or not equal to the older and well tried kinds.

GENERAL NOTES BY EXPERIMENTERS.

Algoma Station.

Apples.—There are now in test at this station eighteen varieties of apples, planted in the spring of 1899, all of which have done well and some varieties have made a remarkable growth. Among the latter I may mention Longfield, Wolf River, Stark and Gideon. Sweet Bough is the only tree so far that has made poor growth. All have received clean cultivation and a root crop was grown on the experimental plot ; the trees have been sprayed at different times for leaf aphis with different remedies, of which I have found tobacco water the safest and most effectual. I do not look for any fruit yet as the ground is rich in nitrogen and the trees are making heavy

growth ; although it is no unusual thing for trees to bear fruit two years from the nursery in this section. I think this tendency to early bearing should, for the good of the future tree, be checked. I have also in test several kinds top grafted on hardy stock, varieties which I know would be too tender here in their own roots. Some experimental work along this line will no doubt lead to some interesting results and we may find it possible to grow Spys, Kings, etc., yet in Algoma. Also I am a strong believer in the individuality of a tree, as much so as in an animal, and do not see why the same results should not be obtained in the one case as in the other. Given a good hardy, healthy stock, top-graft from healthy bearing trees, and we may yet get just what we are looking for—a first class, long keeping winter apple, such as Greening, Baldwin, etc. So far we have nothing better as a long keeper than Walbridge, the quality of which is not first class, but is better than when grown in eastern Ontario.

The result in the experimental work here confirms my previous opinion that 75 per cent. o loss among our fruit trees is caused by sun scald, that is, provided the tree has received proper attention otherwise, such as clean cultivation, etc., and some protection. The roots are never, and the terminal growth on the top seldom, affected by our severe winters. As to varieties, the money maker is the Duchess. Local demand is good yet for four times the quantity of bearing trees in Algoma. First class fruit—and a Duchess will bear more of that than any other variety I know of—can readily be sold at 25 to 30 cents a basket, about one-third of a bushel, and the supply not nearly equal to the demand. Wealthy and Gideon come next, among a host of others, but these two are possibly the most satisfactory all round. I do not know of anything better for late winter than Red Canada, or Walbridge, although many others bid fair to become valuable.

Insects.—The forest tent caterpillar was not much in evidence this year ; the bud worm, for the first time, has been noticed and in some instances has done considerable damage. The borer, especially in the close vicinity of poplar woods, requires a close looking after. The codling worm is unknown. The oyster shell bark louse is prevalent chiefly owing to the carelessness and inattention of the owners.

Cherries.—Thirteen trees of cherries planted in the spring of 1899 have done fairly well ; 5 varieties planted this spring, viz., Riga No. 18, Minnesota, Ostheim, English Morello, Russian Morello and Hortense, have made abundant growth. I may say that so far those on the experimental plot are apparently hardy, but from experience I would not advise any one to get nearer a sweet cherry than Reine Hortense, for the chances are the tree will never live long enough to bear fruit, and, if it does, the birds are sure to take them. Montmorency is by all odds the best. Richmond is a few days earlier ; these two, up to the present time, are decidedly the best. I am not aware of any insect pest attacking the cherry.

Black knot, formerly prevalent, has now disappeared and by keeping the head of the tree low in order to protect the trunk somewhat from the sun we may anticipate success in growing sour cherries.

Pears.—Four varieties were planted in 1899 and all are alive, Keiffer, has made the strongest growth, and Flemish Beauty comes next. Last spring I received and planted five varieties of Russian pears which have all made a remarkably strong growth. Some of the new wood on Baba and Bessemianka measured five feet. I would not like to say that we will be very successful in pear culture here, although they may be grown in a small way for home use. Perhaps we may get something worth cultivating among the Russian varieties.

Plums.—Of twelve varieties planted in 1899, the following are dead : two trees Smith's October, one Willard, one Abundance; of five varieties planted this spring, all are growing. From two years' experience with the Japan plums I am led to believe that they are just as hardy, if not more so, than the Domestica class. Some in fact make such a rampant growth that one might be in doubt whether it is a plum tree at all or some species of the willow family. We have no curculio here as yet, and the following kinds have borne fruit and do well in the order named : Moore's Arctic, Duane's Purple, Lombard, Abundance, Weaver. A very fair quality of plum is found growing wild here.

Strawberries.—Eight varieties planted in 1899 arrived here in such poor condition that I had difficulty in saving enough to propagate from. I encouraged what plants I could to make runners, with the result that I have 60 feet of rows of the different kinds. Judging from last season, Clyde comes first, with a close second in Haverland. Saunders was no good, and yielded a few poor berries with hard unripened ends, but none of the newer kinds in my opinion equal in flavor the old Jucunda, although they certainly yield a heavier crop.

I think we might make a specialty in strawberries here, they require no winter covering except the snow, and I do not recollect missing a full crop for the want of rain at the right time.

Raspberries and Blackberries.—Eleven varieties arrived here in poor condition, the larger portion of which did not survive until winter. This was supplemented by eight varieties this spring, all of which have done well. Those planted in 1899 were left uncovered but in a somewhat sheltered position, with no apparently bad results. I rather think it would be unnecessary to cover blackberries as the snowfall would be quite sufficient protection. Black Caps

uffer from the weight of snow breaking them down. I have fair Cuthbert and Louden bushes but would not advise any one to plant and care for them where the wild fruit is so plentiful.

Grapes.—Of ten varieties planted I may write failure. Some are alive but many are dead. Perhaps the soil has something to do with it as my old vines carry a heavy crop every year. I moved some of them this spring to what may be a more suitable location.

Gooseberries and Currants.—These have all done well. This is an ideal locality for all small fruits. I can see very little difference in the different varieties of currants so far as yield is concerned. Plenty of rotten manure forked in, makes all the difference in small fruits. Among gooseberries, Downing is the best, or Pearl, which is similar.

Chas. Young.

Bay of Quinte Station.

Nearly everything in the experimental grounds is doing well, and making a handsome top, except some that were not healthy and covered with moss; these should have found their way to the brush heap instead of being planted in the orchard. However, it makes a fine illustration for the visitor who is thinking of planting an orchard, for he at once makes up his mind to have the best trees that can be got, and will not accept of aged trees.

The fruit buds of nearly all the plum and cherry trees were injured last winter and gave no fruit this season. Some of the Japan plums were killed back and, strange to say, not a bud of the peach trees was injured. The latter have made fine growth this season, and I hope to have some fruit next year.

The apple crop has not been more than half a crop this season. The apple buyers went through the country telling the growers of the over-production, and saying that they would not be able to pay more than 40 to 50 cents per barrel for the fruit.

The growers became discouraged, allowed part of their fruit to go to waste, and finally sold for almost nothing. A few growers said, "No, we will ship," gathered their apples and forwarded them to the markets, and have done well, realizing from $1.50 to $4.00 per bbl. All growers should pack their own apples and ship them to the markets, realizing the profits themselves. In that case a better quality of apples would be shipped, the cider apples would not be put in by the grower, and he would put his own name on the barrel and the correct name of the fruit. Another evil was brought about through the influence of an agent of one of the best houses in Liverpool who persuaded the grower to ship his Greenings and Baldwins the last week in August to Liverpool. He received a small sum for his apples, and he was at the same time destroying the market for the future. People buying those apples would not want any more, as they were too green to cook, or eat, in fact, not good enough to feed to stock. The grower was made to believe there was an immense crop of apples in the country, which he has since learned was not the case, but it is too late, for his apples are all gone.

There is a marked difference in the management of the orchards in this district in the past few years. The average farmer is realizing that, to have fruit that will sell, he must give more attention to the orchard, to careful pruning, to better and more thorough cultivation, less cropping, more fertilizer, that he must keep the cattle out and spray the orchards thoroughly, several times during the season, if success is to crown his work. The tent and the forest tree caterpillars and canker worm have been very destructive to the forest, and, in consequence, the orchard of the careless farmer during the past three seasons does not furnish his table with such fruit as he had a few years ago. Such men will need to step out of the fruit business, giving place to the more careful grower.

W. H. Dempsey.

Burlington Station.

There are 242 varieties of fruit now under cultivation at this station, as follows: Currants, 22; blackberries, 22; pears, 44; plums, 50; grapes, 24; raspberries, 28; peaches 18; apples, 25; cherries, 7; quinces, 1; mulberries, 1.

The general fruit crop here was fairly good. Prices were average, leaving a fair margin of profit. Trees, plants and vines generally are going into winter in good condition. The work of the frost of February, 1899, is now pretty clearly defined, the plants, vines and trees thereby destroyed having been removed and their places refilled.

More and more attention is being paid to the care of fruit plantations, and the better handling and marketing of fruits. The question, too, of suitable manures for the various fruits is claiming the attention of progressive fruit growers. There has been very little fungus or mildew, but insect enemies were exceptionally troublesome. The Codling Moth, or Apple Worm, and the Apple Maggot were both very destructive. The latter works on both leaves and fruit, drilling microscopic holes into the apples in various directions. I used burlap bands for the former on about 100 apple trees, placed on them about the middle of June. Under many of these, when removed, I found from 75 to 125 apple worms in their cocoons. I believe that the proper and careful use of bands would be the best way to keep these pests in check. I am also inclined to think that there were more than two broods here this season.

Apples were a fair crop of good quality. In the younger orchards about half of the fruit was wormy, but the apples were clean and well-formed. In the old orchards the fruit was small but not so wormy.

Pears were also a fair crop of excellent quality. While there were some worms, there was very little blight.

Plums were a very light crop. The quality was, however, good.

Peaches were a very light crop. Next year I hope to give some notes from the experimental peaches.

Grapes were a fair crop of fine quality. There was very little mildew. Of the 24 varieties in my vineyard, the Worden has proved the hardiest.

Cherries were a good crop of excellent quality and sold at very satisfactory prices.

A. W. PEART.

EAST CENTRAL STATION.

I have not gone into details as I was requested, *i. e.*, I have not given paragraph notes on varieties. The young trees have made a very satisfactory growth and ripened their fruit and wood buds well. I have just finished sorting and packing my fruit and the result is I will have fully twenty per cent. more fruit this year than in 1896, or any other year, and the size and color of the fruit is very satisfactory. The high wind of September 12th blew off about ten per cent. of the crop, but afterwards the remaining fruit grew so fast that the late varieties made up the difference.

Our system this year in my bearing orchard has been to keep the one-horse scuffler going over the ground frequently until the trees were so loaded that the branches interfered. The result is 90 to 95 per cent. of the fruit clean and free from worms. In fact, in some varieties it was a rare occurrence to find a wormy apple. We commenced spraying April 14th: then on the 28th of April, 12th of May and twice afterwards. We top-dressed one part of orchard with Thomas' phosphate, another part with stable manure, and another part with bone dust, ashes and manure. The trees in the latter plot seemed to do the best, both in growth and fruit.

I feel fully persuaded that clean cultivation, thorough spraying and close pruning is the proper way to get good returns from an orchard, and unless these are attended to at the proper time poor returns will be the result, especially in a year like this, when apples are so cheap. I have no fear of a loss in an orchard well attended to.

This district has shipped more fruit this season than in any former year, although the price has ranged from 65 cents to $1.15 per barrel, the latter price being for a choice lot of Spys, and as the price has been good in Europe, our shippers ought to make up more than they lost last season. The summer has been very dry and the want of moisture has checked the growth of fruit till September when a few copious showers refreshed the ground, and the trees made a rapid growth both in wood and fruit. Pears were an immense crop and sold about 20 per cent. less than last year. We tried the process of thinning some Keiffer pears: the result was we had as many bushels on the thinned trees as on the unthinned, and the fruit was more than double the size and sold for $1.70 more per barrel, so it pays to thin. I usually took off five pears and left one on, and even at that some of my trees broke down. I have great faith in the new pear, Dr. Jules Guyot, and believe it will excel that excellent pear the Bartlett.

R. L. HUGGARD.

LAKE HURON STATION

The report of this station must of necessity be short this season, owing to the non-fruiting of many varieties of plums and cherries and the very small yield of bush fruits. There was no planting done at this station during the present season, with the exception of eleven varieties (in all thirty-three trees) of French pears. These trees arrived here on the 21st of May and were planted on the 2nd of June. All the trees started and have done well, excepting one or two. This will be a very interesting experiment.

The apple crop in this district was a very small one, although the fruiting orchard at this station early in the season gave promise of as large a crop as that of last year, but, on account of the hot dry weather during June and July, the codling moth and the bitter rot was very prevalent especially on the russets, and the crop in consequence of this was only about half what it at one time promised to be.

The cherry and plum crop were a total failure. The yield of bush fruits was less than hal a crop owing to the extremely hot, dry weather. We had no rain during the whole period o the picking season. It will not be necessary for me to describe any of the plums or cherries as there was no fruit; only to say that all of the stock is doing well and has made the remark able growth of from twenty to sixty inches.

SPRAYING.—The plums, cherries and bush fruits were sprayed three times: first, before the buds opened, second before the bloom, and third, after the bloom fell. The apples were only sprayed twice; first before the bloom, and second after the bloom fell. They ought to have been

sprayed the third time but owing to the pressure of work it was neglected ; however, we had very little of the black spot this season.

Insects.—The tent caterpillar was as numerous as last season but did very little harm, all dying off early in the season. The codling moth was very bad and other insects about as usual. On May 30, I found a few specimens of the cigar case bearer.

A. E. Sherrington.

Simcoe Station.

This year is what may be called an off year for this locality, so far as fruit is concerned. The trees apparently came through the winter in good condition, and there was a great profusion of bloom on all kinds of fruit trees, and the weather during the blooming period was all that could be desired. Yet the fruit failed to set in many cases, and in some cases set fairly well and fell off afterwards. So that, with the exception of early apples, tree fruits were almost a total failure in this section, this year. Cherries and plums may be described as a total failure. Early apples were a good crop, with fall apples far below the average and winter apples nearly a total failure. Strawberries, raspberries and blackberries yielded well. This shows the necessity of having different varieties of fruit, so that when one variety fails you have something else to depend upon, and in no one year do all kinds and varieties of fruit produce a fair, or average, yield.

The question may be asked here, what is the cause, and why, in a year when everything seems favorable, climatic conditions are, or seem to be, right and there is abundance of bloom, and yet the fruit is a failure. In my opinion it is owing to a combination of causes. Many varieties of apples are inclined to set a heavy crop one year and go barren the next. The maturing of a heavy crop exhausts the energies, or vitality, of the tree, so that it is not able to produce fruit buds for another crop the same year, and so must rest a year to recruit.

Last year we had a crop of winter apples considerably above the average. This year they were almost a failure, but the trees are now very full of strong looking fruit buds, promising a large crop next year. The early apples work much in the same way.

It is asserted that a systematic thinning of the fruit will remedy this. I have not yet tried it, but I purpose beginning with the year 1901 an experiment with a few trees. In the case of trees setting a very large crop, I propose a thorough thinning of the fruit, and with others a thorough pruning, along with high fertilizing, to see which will give the best results. Then in the case of tender varieties of fruits often the fruit buds are killed during a severe fall of temperature. The tree may bloom freely in spring, and yet the pistil or germ of the blossom may have been previously killed during a cold snap in winter. This does not prevent the petals of the blossom from unfolding and presenting a normal appearance. Much, I believe, depends upon the condition of the trees during fall and winter. Some years without a very severe fall of temperature during winter the fruit buds of tender sorts of fruit will be killed, and in other years, with a much lower temperature, they will come through unharmed. These facts suggest the idea of investigation and experiment to find out how far one may exercise any control over these conditions, by way of an early cessation of cultivation and the sowing of cover crops, to protect the roots, and to check late growth and induce an early ripening and hardening of the new wood, and by any other means that may suggest themselves.

Insect Pests.—The tent caterpillar has not been so destructive this year as formerly. Orchards that are properly sprayed are not at all troubled with it, and my own experience goes to show that it is easily controlled by spraying at the right time, and that is just as young caterpillars begin to feed on the leaves. But we must use more Paris green than that prescribed in the usual formula. Instead of four ounces to 40 gallons, increase it to eight ounces, using plenty of lime, and there will be no injury to the foliage. The worst insect pests we have here, in my estimation, are the oyster shell bark louse and the codling moth. The bark louse is easily removed from trunks of the trees by alkali washes, but the difficulty is to get at them when they are clustered among the small limbs and outer twigs. In fact, in trees of bearing age, it is on these latter they get in their work, as they cannot work on the trunks when the bark gets coarse and thick. Prof. Macoun, of Ottawa, reports that the spraying with lime early in spring is an effectual remedy. I have not yet tried it. With regard to the codling moth, I am convinced that, while Paris green may be effectual to some extent, the most effective remedies are trapping them by means of bands around the trees and allowing hogs to run in the orchard to pick up the infested fruit as it falls. I am satisfied, from the experience already gained, that these two plans together are the most effective. On account of the failure of cherries and plums and the almost entire failure of apples, I have not been able to make any comparative statement of yields that would be of any value.

Cherries.—With regard to the cherries, they are all healthy and making a good, thrifty growth. They are all under clean cultivation. Small fruits are grown between the rows, and the fertilizers used are stable manure and hardwood ashes. From the experience gained so far

I would place the English Morello and Dyehouse ahead of all others that I have tried. However, there are a large number that are yet to come into bearing, and some of these may prove just as good.

Apples.—Some of the varieties of apples have borne a few specimens this year. One among them, named the *Peerless*, seems worthy of special notice. This variety originated in Minnesota, and is a seedling of Duchess of Oldenburg. It was introduced as a winter apple, but unfortunately it is not. Its season is about the same as the Colvert. It will average as large as the Colvert. It is in color a beautiful red, clean skin, even size, very good dessert quality, and for cooking has no superior. The tree is of an open habit of growth, bears quite young, and is apparently very hardy. This apple ought to take well in the British market. It is the most promising of the new varieties I have yet tested. *Gano* has fruited for two years. This, like the Peerless, has been planted five years, and like it began to bear three years after planting. The fruit may be called a compromise between the Ben Davis and Baldwin. It is not of first rate quality, but is handsome in appearance and a great keeper. It ought to be a splendid shipper. *Shiawassee Beauty*. This apple fruited this year. Also the *Scarlet Pippin*. Both of them have the flavor of the Fameuse, from which they originated, showing that the Fameuse must fertilize its own blossoms, must be a strong pollenizer, as it stamps its individuality on all its seedlings.

The McIntosh Red, from the same origin, however, excels its parent. It is larger in size and superior in flavor, and has few equals and no superiors as a dessert apple. But like all the progeny of the Fameuse is a little inclined to scab. It grows to great perfection here, and if it can be kept clean by persistent spraying will be a profitable variety, for there is always a good demand in the home market for dessert apples of the Fameuse type. None of the Russian apples, other than those that have been described in former reports, have fruited this year. So far, the Russians that have fruited are all early varieties, none of them having any merits for dessert, they are fairly good cookers but coarse in the flesh. They are clean skinned, however, and some are of fine appearance. The trees appear to be very hardy, and make very fine stock for top grafting other varieties on, and in this I believe will be found their chief value.

The *Russian apricots* are simply cumberers of the ground. They do not bear, do not blossom even. They just come through the winter alive and that is all. Their fruit buds seem to perish in winter. When warm weather comes they seem to recruit and make a fair growth and look healthy, but the winter nearly kills them. Several have died, and I have little doubt the rest will fail ere long. I would not advise anyone in this district to plant them.

Plums.—The *Red June* fruited this year and it is a very fine plum, and quite up to Burbank, and it bears early and ripens fully three weeks ahead of any variety I have except the Early Botan which comes in about the same time. But the latter, though a very dainty little plum, is too small and has the fault of dropping prematurely from the tree. *Weaver* and *Black Hawk*, among the American varieties, fruited, and they are little, if any, ahead of the old fence corner plums of early days. My experience of plums leads me to the conclusion that the better class of plums are an uncertain crop in localities where the temperature falls more than 20 degrees below zero in winter.

Raspberries.—We need a hardier market berry than Cuthbert. The tips kill back so far in winter there is too much waste of canes, and the outer clusters of berries, next the frozen wood, are small and often fail to mature. The Louden will, I think, pretty nearly fill the bill.

I have been very successful in checking the anthracnose, by a thorough spraying with the Bordeaux mixture, in spring when the canes are bare.

Blackberries.—Of a dozen varieties tested here the Agawam is the only one I would recommend for this section. I had a fair crop of very fine berries this year of this variety, which competed successfully in the local market with the berries from the south.

Spraying.—My experience in spraying leads me to the conclusion that Fusicladium or apple scab is more easily prevented on some varieties of fruit than others, and this I believe is owing to the quality and texture of the skin of the fruit. This suggests an experiment with a much stronger solution on some varieties. The Baxter apple and Flemish Beauty pear took on the scab this year while the leaves and young fruit were covered with Bordeaux mixture, made according to the usual formula, and while the sprayed trees showed much better fruit than the unsprayed ones, and held their foliage after the others were bare, yet so far as preventing the scab, it was far from successful. The Golden Russet will often be more affected in the leaves than in the fruit; while the Baxter and Snow and others will have healthy clean foliage and scabby fruit. I am therefore inclined to the belief that one uniform formula is not applicable to all kinds of tree fruits, and that while spraying, as now practiced, improves the fruit, and the health and vigor of the tree, there is much to be learned yet by experiment in connection with it.

Top Grafting.—This practice cannot be too strongly recommended for this district, and the best and most successful orchards of the future will be those where the most valuable varieties have been top grafted on hardy stock. I have seen Northern Spys, five years from the graft,

laden with fruit. To get the best results the grafting must be done while the trees are young, and it only then requires a few grafts (often three or four will do) to form a new top. I know of no better stock for the purpose than Tallman Sweet, though I am having good success with many others, and especially the hardy Russian varieties.

The experiments in top grafting pears are also proving successful, using Russian and Flemish Beauty stocks, and grafting on them Bartlett, Duchess, Lawson, Lawrence, Anjou, Clapp and others.

The following list of apples are too tender for this section and should always be top grafted on hardy stock :—King, Grimes' Golden, Red Canada, Greening, Baldwin.. The following are half-hardy :—Ben Davis, Mann, Spy.

These lists will have to be added to from year to year. Many varieties grow and thrive well while young and fail soon after they begin to bear, so one cannot judge of the hardiness of a variety, or its suitability to a locality, from its appearance while young.

Humidity.—Though no very long interval occurred between showers yet the summer was a most decidedly dry one. The rainfall was not sufficient to penetrate the soil far enough to do much good. Yet, all the experimental stock made a satisfactory growth, as it was all under cultivation, and received clean culture all through the summer, thereby retaining the moisture.

Cherries and plums have made an average growth of 18 inches, pears 18 to 20 inches, and apples 16 inches of new wood.

Quite a large amount of correspondence is now necessary during the year in answering letters of enquiry in matters pertaining to fruit, giving advice as to best varieties to plant, etc.

Some nursery agents have come for advice as to suitable varieties for the locality, and I take very much pleasure in giving them a marked list of the varieties of fruit which I can, from my own experience, recommend for planting in this district. The following fruits have failed as too tender, and intending planters are warned not to waste money on them :—*Apples*, Red Canada, Sweet Bough, Grimes' Golden, Early Strawberry ; *Plums*, Wickson, Shense, Grand Duke.

As already stated I expect to be obliged to add to these lists from year to year. And intending planters would consult their own interests by asking advice as to varieties before investing their money, and advice of this kind will always be cheerfully given.

G. C. Caston.

St. Lawrence Station.

The spring of 1900 will long be remembered as illustrating the great resisting power of buds to cold, even after they have swollen and commenced to burst. The last days of April were warm and bright, and on the 2nd to 4th of May buds were bursting in many cases : on the 5th and 6th frost, the 7th frost and ice three-eighths of an inch thick in a wooden trough, 8th and 9th rain, 10th and 12th frost and ice five-sixteenths of an inch thick. On the 18th and 19th the blossom was showing, and on the 20th some of the plums were in bloom. And after all the severe frosts, with the buds about bursting, there was practically no injury except in very few cases, such as the Ostheim cherry and the pistil of the central blossom in the cluster on some Fameuse trees. At the blossoming period we had ideal weather for the fertilizing of all perfect bloom, and a fair crop of well formed fruit followed.

In the plot of apples the trees are making very satisfactory growth, and a few varieties produced a few specimens, but the gales of September destroyed the most of them. The most promising varieties in winter fruit that have borne with me yet are Milwaukee and Ontario. These were the only varieties that brought fruit to maturity, and they give promise of being valuable as winter apples for this section.

In plums I had 16 varieties blossom, but of these only about 14 developed fruit, a description of which will be found below. Insects and fungi gave me very little trouble this year, and I had only one case of black knot, on a Montreal plum, that I removed successfully by cutting the knot away and pasting over the wound a mixture of lime and copper sulphate, which treatment I have never had fail during the last five years.

Pears are succeeding fully as well as, or better than I expected. All my trees look healthy and I have had no blight, except in the Russians, to amount to anything. Since pears give promise of succeeding with me, and such varieties as Dempsey and Howell have proved hardy for the last four years, I intend top-grafting varieties such as Bartlett and Anjou on Flemish Beauty stock, to find out if those varieties will succeed grown in that way. I beg to acknowledge the receipt of 33 pear trees from France, which came rather late for successful planting, but I have been able to save enough to give me trees of each of the eleven varieties.

Insects were not very numerous and fungi were kept under control by five sprayings with Bordeaux and Paris green. The dates of spraying were May 2nd and 18th, June 4th and 18th, July 6th. I have had very satisfactory results spraying with pure lime and water during the winter months to remove oyster-shell bark-louse, but I will require another year's experience before being able to determine the cause of partial failure in some cases.

Harold Jones.

Wentworth Station.

Many of the vines planted at this station for experimental purposes were so badly injured by the winter of 1898 that a fair comparison of growth or productiveness cannot be made, or even hardiness, as vines of the same variety, standing quite near each other, have been destroyed, while others appear to be only slightly injured.

In our report of last year we described the following varieties as promising to be of value :— Amber Queen, Brilliant, Colerain, Cambridge, Dr. Collier, Early Ohio, Early Victor, Moore's Diamond, Opal, Presley, Watt and Woodruff Red. These have all done well this season, except Colerain and Early Ohio, both having proved failures, either from lack of vigor or being root killed by the frost of 1898.

Mills and Winchell, which have been reported as promising, are failures this year ; Mills is a fine, large, black grape of good quality and a very long keeper, but it lacks vigor. When bearing a crop of fruit, it makes no growth of wood for next season's crop.

To sum up the experiments with about one hundred varieties that have been fairly tested at this station : Those of good quality, hardy and productive, are *Black*, Worden, Early Victor, Concord, Wilder (Roger's No. 4), Aminia (Roger's No. 36), Herbert (Roger's 44) ; *Red*, Delaware, Brighton, Catawba, Lindley (Roger's No. 9), Agawam (Roger's No. 15 , Requa (Roger's No. 28); *White*, Moore's Diamond and Niagara. With a prospect of growing grapes for export the black and red Rogers will no doubt take the lead.

The plums planted at this station have grown well, but few varieties have borne good crops, Abundance, Burbank, Grand Duke and Reine Claude have borne well and consequently have so far been most profitable.

The canker worm made its first appearance here this season. The trees infested were sprayed with the Bordeaux mixture, four ounces Paris green to the barrel, which destroyed a small proportion of them. A few days later they were sprayed with eight ounces of Paris green to the barrel of Bordeaux mixture which destroyed them entirely.

The codling moth is one of the most destructive insects we have to contend with in this locality. A by-law was passed in this township (Saltfleet) enforcing the Noxious Insect Act, which obliges every owner of pear and apple trees of bearing age to bandage the trees with "Burlap" or "Sacking" and to have these bandages removed and all larvæ destroyed every two weeks during the months of June, July and August. By this means an average of about thirty-eight to the tree were destroyed in an apple orchard of over four hundred trees at this station, and yet the crop was badly damaged this season. If the Act is enforced for a few years in any municipality it must certainly help to relieve us of this pest.

Tests with three kinds of commercial fertilizers have been made for two years on grape vines, pear and plum trees, with very little if any results either in wood growth, quantity or quality of the fruit. This may be partly owing to the very dry weather during the growing season. These tests have been made on dry, heavy land where I believe to grow fine large fruit the great requirement is moisture.

M. Pettit.

APPLES.

Notes by W. H. Dempsey.

(Bay of Quinte Station.)

Bismark.—A very small tree planted in 1896, made very, very little growth : inclined to fruit, and has fruited two seasons ; foliage good. Fruit, 3 x 2½ inches, round, somewhat conical. Skin, greenish yellow, nearly covered with streaks and splashes of bright red. Calyx open, set in a broad, moderately deep basin. Stem short, set in a narrow cavity. Flesh white, coarse grain, juicy, crisp, mildly acid ; quality medium. Season, December, January.

Duffey's Seedling.—Top grafted in 1896, made a good growth and has had a good crop for two years of very attractive apples. Fruit oblong, conical, five faint ribs ; 2¾ x 3½ inches. Skin whitish yellow, nearly covered with a lively red, with streaks and splashes of a darker red, numerous small white dots. Calyx large, partly open, set in a narrow plaited or ribbed basin. Stem short, ⅝ inch, slender, set in a narrow cavity. Flesh white, breaking, juicy, sub-acid, medium. Kept good till March.

Domine.—Top grafted 1895 ; made good growth, foliage healthy. Fruit large, 2½ x 3 inches, roundish oblate. Skin greenish yellow, nearly covered with streaks and splashes of bright red and numerous small russet specks. Calyx small, closed, set in a broad, moderately deep basin. Stem ⅝ inch, slender, set in a wide, moderately deep cavity. Flesh white, tender, juicy, sprightly, pleasant, flavor good, core small. Fruited first in 1898, kept good till April, productive. I think it would take well in market.

Haskell Sweet.—Top grafted 1895. Made good upright growth; fruit 2½ x 3½ inches, oblate. Skin greenish yellow, with a blush on side next the sun. Caylx closed, set in a broad, medium deep basin; stem ½ inch, inserted in a rather broad, deep cavity. Flesh yellowish, tender, juicy, sweet, rich, with aromatic flavor. Very good. October, November.

Isham.—Top grafted in 1896, made good growth. Fruit round, conical, 2¾ x 2½ inches. Skin bright yellow, nearly covered with streaks and marbled red. Caylx closed, set in a narrow, uneven basin. Stem ½ inch, medium, set in a narrow, deep cavity. Flesh yellowish, white, coarse, breaking, not juicy, almost sweet, of medium quality. October, November.

Longfield.—Planted in 1894. Tree slow grower, caused by early and heavy fruiting. Fruit medium size, conical. Skin yellowish, with a pale blush on side next the sun, with a little russet. Caylx closed, set in a narrow basin; stem slender, set in a narrow, moderately deep cavity. Flesh white, juicy, mildly sub-acid, pleasant. October, November. Not a good apple for shipping.

Malinda.—Top grafted in 1896, made a medium growth; fruit 2¼ x 2½ inches, oblong; skin, lemon yellow, with a little blush on side next the sun. Caylx small, closed, set in an uneven basin. Stem ¾ inch, slender, set in a narrow, deep russet cavity. Flesh white, tender, crisp, pleasant. Flavor sweet; kept well till April.

Missouri Pippin.—Top grafted 1895, made good growth; fruit 2 x 2¾ inches, roundish, oblate, somewhat flattened at the ends; skin pale whitish yellow, shaded, striped, and splashed with light and dark red, quite dark on side next the sun, with large and small gray dots. Calyx partly closed, set in a slightly corrugated basin; stem short, ⅜ inch, small, set in a deep cavity; flesh whitish, a little coarse, crisp, breaking, moderately juicy, sub-acid, good; core small. Kept good last year till April. Fruited heavy this year and very even in size, would no doubt make a good commercial apple.

Red June (Carolina seedling).—Top grafted 1895, made good growth; fruit 2¼x2, conical; skin yellow nearly covered with deep red, darker on side next the sun with a thin bloom; caylx closed, set in narrow plaited basin; stem slender, inserted in a small narrow cavity; flesh white, brisk, tender, juicy, pleasant, sub-acid very good; July, August.

White Pippin.—Top grafted in 1895, upright, good grower; fruiting some for the past three seasons; fruit 2⅔x3, roundish, oblate, slightly oblique; skin greenish white, sprinkled with numerous green dots, becoming pale yellow at maturity: caylx small, nearly closed, set in an abrupt, furrowed basin; stem, 7¼ inches set in a large cavity; white, tender, crisp, juicy, fine rich sub-acid; very good; core small; not attractive in appearance; very subject to fungi; March and April.

Notes on Vigor and Habits of Newer Varieties by A. E. Sherrington.

(*Lake Huron Station.*)

American Pippin.—Strong, upright, spreading, forming round close head; growth 20 inches; two years planted.

Barry.—Strong, upright, spreading, good straight branches; growth 12 inches; three years planted.

Bismark.—Upright, spreading, strong clean branches; growth 12 inches; early bearer; three years planted.

Canadian Baldwin.—Tree upright and spreading, inclined to make an open head; growth 16 inches; three years planted.

Cranberry Pippin.—Strong, upright, spreading, inclined to form a good round head; growth 16 inches; three years planted.

Fannie.—Upright, spreading, slender branches; growth 18 inches; two years planted.

Gano.—Upright, spreading, clean small willowy branches; growth 12 inches; three years planted.

Hurlburt.—Strong grower with spreading top; growth 16 inches; three years planted.

Milding.—Strong, upright; growth 12 inches; two years planted.

Northwest Greening.—Strong, upright grower, inclined to fork; growth 15 inches; three years planted.

Newtown Pippin.—A poor, slow grower; growth 12 inches; three years planted.

Ontario.—Strong, upright, spreading, clean limbed with inclination to form good round head; growth 14 inches; three years planted.

Patouse.—Of rather spreading habit, clean willowy branches; growth 14 inches; two years planted.

Peter.—Upright, spreading, clean, small branches inclined to form a one-sided lop; growth 15 inches; three years planted.

Salome.—A clean, straight, strong upright grower with close round head; growth 17 inches; three years planted.

Scarlet Pippin.—Straight, vigorous upright grower; growth 19 inches; two years planted.

Star.—Strong, upright, spreading; growth 12 inches; two years planted.

Wealthy.—Upright, spreading, vigorous; growth 25 inches; three years planted.

Winesap.—Spreading, with open top, vigorous ; growth 17 inches ; three years planted.

Yellow Transparent.—A clean, upright, vigorous and hardy grower, early and productive, season July and August, quality good ; growth 25 inches ; two years planted.

BLACKBERRIES.

DESCRIPTIVE NOTES BY A. W. PEART.

(*Burlington Station.*)

Blackberries were only a fair crop. The varieties that suffered the most from the severe cold of February 1899 are now apparent. From an experimental standpoint the frost probably served a useful purpose as it carved out a tolerably clear line of demarcation between the hardy and tender varieties. Of those mentioned below, the following may, I think, be fairly classed as too tender for this district : Early Cluster, Early Harvest, Maxwell, Minnewaski.

Of varieties, Agawam, Early King, Gainor, Kittatinny, Snyder and Western Triumph stand at the head. While the four former varieties withstand the drought better, the two latter are more productive.

Agawam.—Plant, upright, spreading, healthy, hardy, vigorous and productive ; berry, oblong, round, medium size $\frac{7}{8}$ x $\frac{3}{4}$ inch, sweet, but rather insipid ; season, medium to late, July 23 to August 15, a profitable blackberry.

Ancient Briton.—Plant, upright, spreading, hardy, fairly vigorous, but not productive ; berry, oblong, conical, medium size $\frac{7}{8}$ x $\frac{3}{4}$ inches, flavor good ; season, medium, July 21 to August 10.

Child's Tree.—Plant, upright, spreading, hardy, moderately vigorous, but not very productive ; berry, ovate-round, small to medium $\frac{3}{4}$ x $\frac{1}{2}$ inches ; sweet and sprightly in flavor with firm flesh ; season, medium, July 20 to August 10.

Dorchester.—Plant, upright spreading, very vigorous, hardy and moderate bearer ; berry, large, $1\frac{1}{8}$ x $\frac{3}{4}$ inch ; oblong-round, firm, sweet and sprightly in flavor ; season, medium, July 23 to August 12.

Early Cluster.—Plant, upright and vigorous, but tender and unproductive ; berry, medium size, $\frac{7}{8}$ x $\frac{3}{4}$, oblong-round, of good quality ; season, medium to late, July 25 to August 10.

Early Harvest.—Plant, upright, moderately vigorous, tender, but very productive ; berry, medium to large, 1 x $\frac{3}{4}$ inch, oblong, conical, of fair flavor ; season early, July 12 to August 1.

Early King.—Plant, upright—spreading, medium vigor, hardy and productive ; fruit, small to medium, $\frac{5}{8}$ x $\frac{5}{8}$, oblong-round, of good quality ; season, early to medium, July 12 to August 5. A promising variety.

Eldorado.—Origin, Ohio ; plant, upright, spreading, vigorous, hardy, and moderately productive ; berry, oblong-conical, medium to large, $\frac{7}{8}$ x $\frac{3}{4}$, sprightly, good in flavor ; season, medium, July 23 to August 10.

Erie.—Plant, upright, speading, vigorous, hardy and fairly productive ; berry, medium size, $\frac{7}{8}$ x $\frac{3}{4}$ conical, round, excellent in quality ; season, medium, July 23 to August 10 ; good commercial variety.

Gainor.—Plant, upright, vigorous, hardy and productive ; berry, very large, roundish-oblong ; $1\frac{1}{4}$ x $\frac{7}{8}$, of fine quality ; season, medium, July 23 to August 10 ; a promising commercial variety.

Kittatinny.—Plant, upright, very strong and vigorous, productive and hardy here so far ; berry, moderately firm, large to very large, $1\frac{1}{2}$ to $\frac{3}{4}$, ovate-conical, rich, juicy and sweet ; withstands the drought better than many other varieties ; season late, July 25 to August 20 ; a fine commercial variety where hardy.

Lovett's Best.—Origin, New Jersey ; upright, stiff, moderately vigorous, hardy, but not productive ; berry, oblong-round, small $\frac{3}{4}$ x $\frac{7}{8}$; of fair quality ; season, late, July 25 to August 15.

Maxwell.—Plant, very weak and spreading, tender and not productive ; berry, oblong-round, large to very large, 1x$\frac{3}{4}$, of good quality ; season, medium, July 20 to August 10 ; too week for commercial purposes.

Minnewaski.—Plant, upright, spreading, vigorous but tender and unproductive ; berry, medium to large, $\frac{7}{8}$x$\frac{3}{4}$, oblong-round, of good quality ; season, medium, July 20 to August 10.

Ohmer.—Origin, Ohio ; plant, upright, spreading, moderately vigorous, hardy and fairly productive ; berry, very large, $1\frac{1}{4}$x$\frac{3}{4}$, oblong-conical, good quality ; season, medium, July 23 to August 10.

Snyder.—Plant, upright, moderately vigorous, hardy and very productive ; berry, medium, $\frac{7}{8}$x$\frac{3}{4}$, oblong-oval, good in quality ; season, early to medium, July 18 to August 5 ; one of the best market varieties.

Stone's Hardy.—Plant, upright, spreading, moderately vigorous, hardy and productive; berry, medium, $\frac{3}{4}$x$\frac{5}{8}$, oblong-conical, of fine quality; season, medium, July 23 to August 10; this variety promises well.

Taylor.—Plant, upright, vigorous, hardy and moderately productive; berry, medium, $\frac{7}{8}$x$\frac{3}{4}$, oblong-conical, of fine quality; season, medium, July 23 to August 10; a valuable commercial berry.

Wachusetts.—Plant, upright, vigorous, hardy but not productive, very few thorns; berry, medium, $\frac{3}{4}$x$\frac{5}{8}$, oblong-round, sweet, of fine quality; season, medium to late, July 23 to August 15.

Western Triumph.—Plant, upright, very strong and vigorous, hardy and very productive, very thorny; berry, medium, $\frac{7}{8}$x$\frac{3}{4}$, oblong-round, good quality; season, medium, July 23 to August 10; a good market variety, but requires thorough cultivation.

Wilson's Early.—Plant, upright, rather weak, hardy but not very productive; berry, large, 1x$\frac{3}{4}$, oblong-round, good in quality; season, medium, July 20 to August 12.

Wilson Junior.—Plant, spreading, vinous, trailing on the ground, some canes 11 feet long; propogates partly by tips and partly by suckers; hardy but not very productive; fruit, medium, $\frac{7}{8}$x$\frac{3}{4}$, oblong-conical, sweet; season, medium, July 20 to Aug. 10.

Notes on Blackberries by A. W. Peart.

(Burlington Station.)

The bushes are banked up in the fall, and cultivation in the spring begins as soon as the soil is dry enough, but before the moisture has left it. Some varieties, as the Agawam, Kittatinny, Gainor and Early King, stand the drouths better than others, such as Early Harvest, Snyder and Western triumph. While thorough and frequent cultivation is desirable for all, the latter sorts particularly require it, as they are apt to dry up and shrivel on the bushes.

Pruning is done in the summer and early spring. In late July or early August, the new canes are cut back to 3$\frac{1}{2}$ to 4$\frac{1}{2}$ feet long, according to the vigor of the variety. In March or early April, the old wood is cut out and the laterals of the new wood shortened. Fertilizers are applied in the spring before the rains are over; nitrate of soda at the rate of 200 lbs. per acre. This is strewn along each side of the row near the canes, but not touching them, and afterwards worked in with the hoe or cultivator. It should not be applied before growth starts, as otherwise it might leach away and be lost to the plants. We find stable manure too awkward to handle in blackberry, raspberry and currant plantations, and prefer some highly concentrated fertilizer that is easily and rapidly applied by hand.

Prices ranged from 7 to 11 cents per quart, according to size and quality, Kittatinny and Gainor selling the highest.

Agawam.—Planted '95; full bloom, June 10th; season, July 21st to Aug. 10th; growth of cane, 6 feet; yield per hill, 1 quart

Ancient Briton.—Planted '97; bloom, June 10; season, July 21 to Aug. 10; growth, 4 feet; yield, $\frac{1}{4}$ quart.

Child's Tree.—Planted '97; bloom, June 10; season, July 20 to Aug. 10; growth, 4 feet; yield, $\frac{1}{4}$ quart.

Dorchester.—Planted '96; bloom, June 9; season, July 23 to Aug. 12; growth, 6 feet; yield, $\frac{1}{2}$ quart.

Early Cluster.—Planted '95; season, July 25 to Aug. 10; was completely destroyed by intense cold of February, 1899; it failed to be an early variety here.

Early Harvest.—Planted '95; season, July 12 to Aug. 1st; was also wiped out by the same cold; it however had done well previously, having a decided place as an early commercial blackberry.

Early King.—Planted '96; bloom, June 10; season, July 12 to Aug. 5; growth, 4$\frac{1}{2}$ feet; yield, 1 quart; this early variety has stood the test well.

Eldorado.—Planted '96; bloom, June 8; season, July 22 to Aug. 10; growth, 5 feet; yield, $\frac{2}{3}$ quart.

Erie.—Planted '95; bloom June 15; season July 23 to August 10; growth 6 feet; yield $\frac{2}{3}$ quart.

Gainor.—Planted '95; bloom, June 15; season, July 23 to August 10; growth 6$\frac{1}{2}$ feet; yield 1 quart.

Kittatinny.—Planted '95; bloom June 12; season, July 25 to August 20; growth, 7 feet; yield $\frac{3}{4}$ quarts.

Lovett's Best.—Planted, '95; bloom June 13; season July 25 to August 15; growth 5 feet; yield $\frac{1}{4}$ quart.

Maxwell.—Planted '97; bloom June 13; season July 20 to August 10; growth 2$\frac{1}{2}$ feet; yield $\frac{1}{3}$ quart; too weak, tender and speading a plant to be of value.

Minnewaski.—Planted '97; season July 20 to Aug 10; frozen out in February '99.

Ohmer.—Planted '97; bloom June 13; season July 23 to August 10; growth 6 feet; yield $\frac{1}{2}$ quarts.

Snyder.—Planted '97 ; bloom June 11 ; season July 18 to August 5 ; growth 4 feet : yield ¾ quart.

Stone's Hardy.—Planted '97 ; bloom June 10 ; season July 23 to August 10 : growth 5 feet; yield ¾ quart.

Taylor.—Planted '97 ; bloom June 10 ; season July 23 to August 10 ; growth 6 feet ; yield ¾ quart.

Wachusetts.—Planted '97 ; bloom June 10th ; season July 23 to July 15 ; growth 6 feet ; yield 1-5 quart.

Western Triumph.—Planted '97 ; bloom June 8 ; season July 23 to August 10 ; growth 6 feet ; yield ¾ quart.

Wilson's Early.—Planted '96 ; bloom June 15 ; season July 20 to August 12 : growth 4 feet ; yield 1-5 quart.

Wilson Junior.—Planted '97 ; bloom June 6 : season July 20 to August 10 : growth spreading, trailing like the black cap canes, sometimes 10 to 11 feet ; yield 1-6 quarts.

Notes on Blackberries, by A. E. Sherrington.

(Lake Huron Station.)

Agawam.—Plants vigorous, strong, hardy and healthy. Berry, oblong, conical; medium size ; quality good. Yield, 5 quarts. Ripe, August 3rd.

Ancient Briton.—Plants upright, spreading, hardy and vigorous. Berry oblong, conical : size medium ; quality very good. Yield 1¼ quarts. Ripe August 7th.

Childs.—Plant upright spreading, very tender and weak, freezes back to the ground every winter and has never fruited here yet.

Eldorado.—Plant upright, spreading, strong hardy and fairly vigorous. Fruit large and of good quality. Yield 7¾ quarts. Ripe August 3rd.

Erie.—Plants spreading, fairly hardy, but not as vigorous as it ought to be. Fruit medium ; fair quality ; not productive.

Early Cluster.—Plants upright, strong but tender, freezes back to the ground every winter. No fruit.

Gainor.—Plants fairly vigorous but tender ; fruit large to very large ; quality very good. Only a few berries to the bush.

Maxwell.—Plants very weak and tender, not productive, of no use here.

Ohmer.—Plants weak and about half hardy, have done nothing here

Rathbun.—Plants half hardy, medium vigor. Berry, very large ; quality good. Yield, 1¾ quarts. Ripe August 1st.

Snyder.—Plants upright, vigorous and hardy Berry medium size : quality very good. Yield 12 quarts. Ripe August 3rd A safe variety to plant.

Stone's Hardy.—Plants upright, spreading, vigorous and hardy, fruit medium of good quality. Yield 5¾ quarts. Ripe, August 7th.

Stone's Early.—Plants very vigorous and hardy ; berry large. Quality of the best. Yield 5 quarts. Ripe August 3rd. A good one.

Taylor.—Plants half hardy, medium vigor ; berry medium. Quality good, but not productive. Yield ¼ quart. Ripe August 7th

Wilson Junior.—Plants spreading, weak and tender, of no use here.

Wachusetts.—Plants weak and tender , berry small to medium, quality good. Yield 2 quarts. Ripe August 3rd.

Western Triumph.—Plants hardy but rather weak, of spreading habit. Fruit medium of fair quality. Yield 5 quarts. Ripe August 3rd.

CHERRIES IN 1900.

By L. Woolverton

(Maplehurst)

Figure 1 shows a view of the cherry plot at Maplehurst, five years planted. These trees are on dry sandy loam, have been given clean cultivation and fertilized with wood ashes. The result of this treatment shows the absurdity of the common notion that the proper place for cherry trees is the fence row, and that cultivation is unnecessary. They have grown with double the vigor of trees not cultivated, many of the sweet cherry class being over 14 feet in height and four inches in diameter of trunk ; also at this early age many of them are well laden with fruit. One of the Early Purple trees, a variety not usually very productive, has so responded to our treatment that it has been fully loaded now for two years in succession, but, ripening early in June, it is generally harvested by birds and boys.

Fig. 1. Maplehurst Cherry Plot, Five Years Planted.

Fig. 2. Fruiting Branch of Reine Hortense Cherries.

The total number of varieties of cherries under test at Maplehurst is 62, and the different habits of growth are an interesting study. For example, Fig. 3 shows a Morello tree, a good type of the habit also of the Kentish cherries, for these differ from each other more in fruit than in tree; this class of trees forms a round head with slender branches, and never attains much height. These five-year-old trees are only about nine feet in height and three inches in diameter of trunk. The Montmorency is a great favorite as a market cherry in New York State, and certainly is a productive kind of pie cherry, far less subject to curculio than the old common red. It ripens about the 1st of July, while the early Richmond can be used for pies about the middle of June. For pies, the Early Richmond, Montmorency and Wragg or English Morello, would cover the season completely. Figs. 4 and 5 shows the bearing habit of the Empress Eugenie and of the May Duke, two varieties of Dukes which so nearly resemble each other that they

Fig. 3. Morello Tree.

are not easily distinguished. Both bear in thick clusters all along the branches, and their mild acid makes them more desirable for pies than the Kentish varieties, at least to the taste of many people. They have one fault, viz., that of uneven ripening, often showing very green samples and very ripe ones on the same bunch. The Duke cherries may well be classed separately from all others, and Fig. 6 shows a good type of the tree. This is a May Duke in our experimental plot, but the Royal Duke, Late Duke and the Empress Eugenie are so similar in habit that one tree will represent them all. They grow upright and attain a considerable height with little spread of branches. The leaves hang down in somewhat fastigiate habit, and the fruit is borne all along the branches, well hidden among the leaves. The Reine Hortense is by far the finest Duke, but it is so different in habit and so immensely superior in size and appearance to the others named, that it cannot be called a typical Duke: indeed, all these divisions are more or less arbitary and shade more or less into each other. Fig. 2 shows the bearing habit of this variety: the cherries do not hang in bunches, but in ones and twos, an excusable fault in a cherry so large and fine as this one.

The members of the Board of Control of our fruit stations visited our orchard on the 3rd of July, and the general verdict was that the Hortense with its load of fruit, was alone worth a

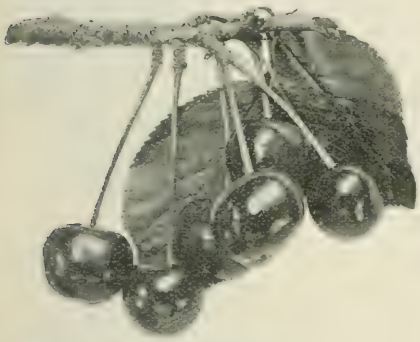


FIG. 4. EMPRESS EUGENIE (REDUCED).

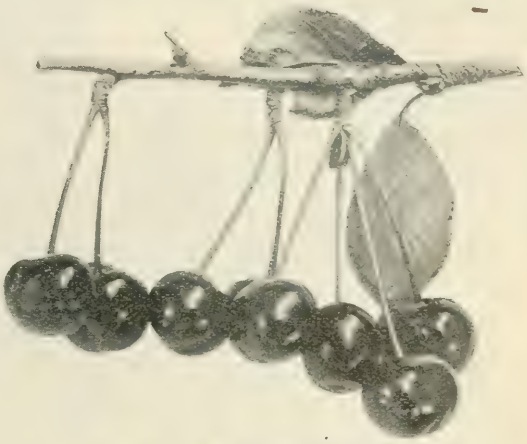


FIG. 5. MAY DUKE (REDUCED).

journey to see. Fig. 2, from a photograph on the 6th of July, well represents a fruiting branch from one of those five year old trees, and will give our readers a good idea of its productiveness this season. The fruit is too soft for long shipments, but for the amateur we know of no equal to it for cooking purposes.

The bearing habit of the sweet cherries is shown in Fig. 7. These trees are very vigorous in growth and form very large trees. Governor Wood and Cleveland, (Fig. 8), very much resemble each other and are of the same origin, but of the two, we think the latter is the finer cherry both in beauty and in flavor. Fig. 8 shows a branch of Elton cherries from one of our five year old trees and for productiveness it certainly leaves nothing to be desired, while Fig. 9 shows a bunch of Cleveland. Hearts and Bigarreaus are both included under the Sweet Cherry class, and the latter are much the more productive. The Black Tartarian well represents the former, while the Napolean Bigarreau is a good example of the latter. These often overload and rot badly from contact with each other in wet seasons unless sprayed after every rain with Bordeaux mixture. Fig. 10 shows a five year old sweet cherry tree in our experimental plot.

FIG. 6. MAY DUKE TREE AT MAPLEHURST.

Nearly all varieties of cherries blossomed profusely and promised a wonderful crop, but a frost just after setting so weakened the vitality of the fruit that much of it dropped, leaving the fruit quite thin on many varieties.

Fearing the appearance of cherry aphis, I applied whale oil soap in a fine spray, using about one pound to five gallons after the foliage appeared, but this was probably too weak, for about the 1st of June the younger leaves were very badly curled with aphis. I then tried spraying with Gillett's concentrated lye, using a small ten cent package, about half a pound, to five gallons of water, an application which has cleared my roses of both aphis and

Fig. 7. Bearing Habit of Sweet Cherries.

Fig. 8. Bearing Habit of Elton.

Fig. 9. Bearing Habit of Cleveland.

thrip, with little damage to the foliage. This seemed to rout the aphis wherever it came in contact with it, but after a fortnight the leaves turned yellow and fell, showing that the lye had been applied rather strong.

FIG. 10. A FIVE YEAR OLD SWEET CHERRY TREE.

Cleveland is the finest of the early varieties, being quite superior to the famous Governor Wood. We noticed the first ripe cherries about June 20th, and some fine samples were still hanging about the 5th of July. It is fairly firm, and has a brighter red cheek than the latter, and excels it in quality, in our opinion.

Eagle is an unprofitable variety at Maplehurst, being very unproductive. The quality is excellent, but the fruit is very scattered and thin on the tree, except in very rare seasons. The Michigan Agricultural Experimental Station gives it 8 for productiveness. We would not give it more than 4. No fruit this season ripened.

Early Purple is another unsatisfactory one for the same reason, although in some cases it gives fairly good crops. One of our sample trees gave a good yield, while the other two gave no yield to speak of. Ripe.

Elton is also unsatisfactory for profit, though not so much subject to rot as usual. It is a good dessert cherry, but no improvement on Cleveland, which will hang until Elton is over. Ripe.

Maurie is a new cherry of great promise, earlier if anything than Early Purple. The quality is excellent, and though not large, it is of excellent quality, and much more desirable for the dessert table. This was its first yield, and we are anxious to watch its further behavior. Ripe 14th June ; crop over 30th.

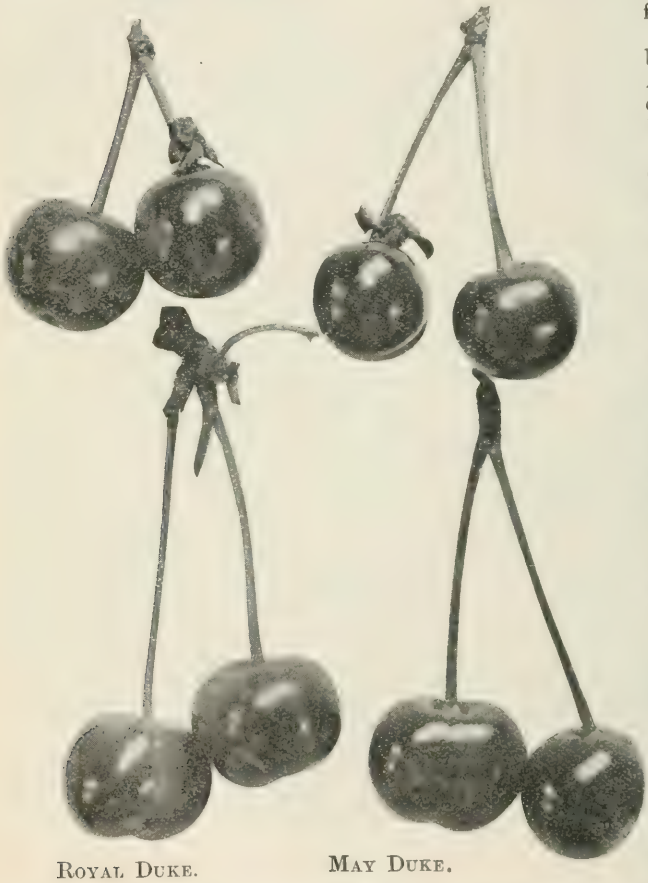
Mezel has always been a great favorite with us, because of its fine size and good quality. It succeeds Black Tartarian. Ripe July 2nd ; crop over about 12th.

Montmorency is a magnificent cherry, which is also most prolific. This year where the trees were under good cultivation, they were very close upon the limbs, and almost every cherry was

perfect, scarcely a single curculio to be found; while the old Kentish pie cherry was badly infested, especially where grown in sod. For the commercial orchard it is just a question where to plant this or the English Morello, for profit. The season in 1900 was from July 8th to 15th.

Napoleon seems to be more subject to rot than any other variety, unless it be the Spanish. This season trees not sprayed rotted badly in spite of the dry weather. Season in 1879, June 25th to 30th, when free from rot, there is no cherry gives more fine fruit than Napoleon.

EARLY RICHMOND. OREL.



ROYAL DUKE. MAY DUKE.

Ohio Beauty is a nice cherry, but too small to be profitable. A four year old tree gave four quarts in 1899. The season in 1900 was June 28th to July 6th.

Purity, a fine little Kentish cherry, quite late, ripening in 1900, July 1st to 25th. A dark red cherry, almost sweet, very agreeable in flavor

Reine Hortense is the finest of all the Dukes for home uses. In 1900 it was ripe on the 28th of June and hung on the tree until July 6th. The crop was exceptionally fine and large, a five year old tree giving eight quarts of cherries of the largest size. This latter point is a great boon to the housekeeper, who hates pitting small cherries. It is too soft for shipping.

Schatten Amarelle, splendid cropper, much the same in appearance and season as Montmorency.

Strauss Weichsel.—In 1900 this cherry was dead ripe on the 6th of July. It is a Duke of fine flavor and dark colored skin.

Windsor.—This variety retains its reputation for general excellence, the tree being very vigorous and upright in habit, and the fruit large and fine; but at Maplehurst in 1900 considerably inclined to rot.

While the Duke and Kentish cherries resemble each other considerably in appearance, the stems of the former are usually longer as is shown in the accompanying photograph. The upper left hand is Early Richmond, and the right is Orel, both so called Kentish; while the lower left hand is Royal Duke and the right May Duke.

NOTES BY HAROLD JONES.

(St. Lawrence Station.)

Early Richmond.—Planted in 1899. Fairly vigorous, growth 15 inches, hardy; blossomed May 24th and set a few specimens that nearly matured on June 25th, when they were destroyed by birds.

English Morello.—Planted in 1899. Vigorous, spreading, growth 20 inches; blossomed May 26th; fruit set, ripening July 26th; destroyed by birds: hardy.

Governor Wood.—Planted in 1899. Made a good growth of 10 inches, upright, no bloom, foliage and tree healthy.

May Duke.—Planted in 1899. Made a very vigorous, healthy growth of 26 inches, upright; foliage and tree very healthy; blossomed May 23rd; set some fruit, ripe June 26th. This variety gives promise of being desirable for this section; hardy.

Montmorency.—Planted in 1899. Made a vigorous growth of 24 inches; spreading; foliage and tree healthy; no bloom; hardy.

Olivet.—Planted in 1899. Made a vigorous growth of 20 inches; spreading; foliage and tree healthy; no bloom; hardy.

Ostheim.—Planted 1897. Made a fairly vigorous growth forming a close, compact head; foliage and tree healthy; blossomed May 24th, most of the blossoms were injured in the pistil by frost, but some fruit set, ripe about July 1st; hardy.

Reine Hortense.—Planted 1899. Made a very vigorous growth of 28 inches, upright, spreading; foliage and tree very healthy: blossomed May 24th, set a few specimens, ripening July 1st, destroyed by birds; hardy; gives great promise.

Vladimir.—Planted 1897. Made a medium growth of over 12 inches, forming a compact head; blossomed May 24th: fruit ripe July 1st; foliage and tree not very healthy, one tree dying; fruit poor, not desirable.

CURRANTS IN 1900.

NOTES BY L. WOOLVERTON,

(Maplehurst Station).

For a few years past currant growing has gone somewhat out of favor, owing to the low prices prevailing. Fortunately for the grower a more encouraging state of things prevails and instead of three cents a quart they are now worth in our best markets five cents which leaves a good margin to the grower, even after expenses of sale are deducted. The acid of the currant is counted very wholesome, and in summer season the free use of currants, either fresh, spiced or in jelly, is worth far more to the human system than most people imagine.

In our grandfather's gardens currants were usually grown against the fence and often left unpruned or uncultivated, and the old Red Dutch was almost the only variety known. The variety was excellent, for it had a brisk, sprightly, mild acid flavor, which gives it first rank; but its small size made it a poor market berry, and slow of harvesting.

Now a great change has come over currant cultivation. With the advent of the cherry currant, so large in berry that it captivated the buyer, and so easy to gather as to reduce the cost of harvesting, there came a great impetus to planting, some asserting that $200 an acre was a common return for the crop. Then came Fay's Prolific with a wonderful flourish, and everybody planted it, and now several others contest the first place for the commercial garden.

To determine the best variety of each color for our Ontario fruit growers to plant was the purpose of the Provincial Department of Agriculture in starting a Small Fruit Experiment Station at Burlington, in charge of A. W. Peart, who has now sixteen varieties of red and white currants in bearing. On the 23rd of July the writer visited this station and found Mr. Peart quite ready to leave the interests of his four hundred acre grain farm to take us through his experimental plots of plums, pears, peaches, grapes and small fruits. In looking over his currants we found his Fays very fine, with bunches about four inches in length. The bush is not equal to that of the cherry in vigor or endurance. The illustration shows excellent fruiting habit, in which there is little to choose between the two varieties, the latter of which is of European and the former of American origin. Very similar to these two popular varieties is the Versaillaise, from France, differing from the two former in having berries of less uniformity in size, and on the whole, averaging smaller. Some of the bushes at Mr. Peart's were a marvel of productiveness, and we thought it worth while to take a snap to show their manner of fruiting. Belle de St. Giles is a magnificent looking currant, so large and fine, but it does not appear to be so productive as the varieties mentioned above. The Wilder, in Mr. Peart's opinion, is the finest market currant in his collection. The bunches are of the largest size, larger than either Fay or cherry, and quite equal to those of the St. Giles, and in his opinion it is more productive than any of them and better in quality.

FAY (REDUCED).

The illustration below shows a fruiting branch of the Red Cross currant, one of the newest varieties which was originated by Mr. Jacob Moore. It has little to distinguish it from the Fay or cherry in its size and appearance. Mr. Green, the introducer, says, "It makes twice the

White Imperial (reduced).

Red Cross (reduced).

growth that these varieties make; the fruit is often so dense on the stalk as to hide the leaves entirely from view. Color, bright red; berries set in a compact cluster, with long stems, convenient for picking." Mr. Peart, in his report for 1899 says the bush is medium in vigor and moderately productive. Another season's trial of this variety may settle its character with greater certainty.

Belle de St. Guiles (reduced).

Of the white varieties, the long bunch Holland has impressed us most favorably at Maplehurst, the bush is so healthy and the bunch and berry so large. But Mr. Peart places the White Imperial at the head of his list of white currants. It is not quite so large a berry as the Holland and shorter in bunch, but perhaps it is more productive, and it has a mild pleasant flavor. There is no use planting white currants for profit, as there is little demand for them in the market, so that we can only recommend them for home use.

The pruning of the red currant is so important that we add a few remarks thereon. The old method of training in tree form has been long given up by us, because the borer often destroys the old stem, and new shoots are needed to take its place. We always allow a half-dozen shoots to grow from the roots, cutting out the older stems from time to time. Those that remain we spur-prune, cutting back all laterals to two or three buds, a treatment that will result in the formation of fruit spurs along the whole length of the main branch.

NOTES BY A. W. PEART.

(Burlington Station).

The currants are plowed to in the fall and cultivated from during the next season, thus levelling the ground during the summer as much as possible. We aim to commence cultivation early enough in the spring to find moisture in the soil, and afterwards to retain it by frequent cultivation until the fruit is nearly ripe. During the past three summers we had to devise something to set-off as far as possible the severe droughts, and the above method is the nearest practical solution of the problem we have found.

Pruning is done in March or early April, the branches of red and white currants being shortened so as to throw out laterals and fruit spurs. Some thinning is also done. The shoots and branches of the black currants are not shortened, but the old wood is thinned out to the extent of about one-third.

Two hundred pounds of nitrate of soda were used per acre, applied when growth started and worked in with a hoe.

Prices of red currants, 4 to 5c. per quart ; of black, 7 to 8c.

Belle de St. Giles. Planted 1896 : in full bloom May 12th ; season, July 8th to August 5th ; yield, 4 lbs. per bush; growth, 6 inches.

Black Victoria Planted 1896. Bloom May 20th ; season, July 10th to August 5th; growth, 7 inches; yield, 4½ lbs. per bush.

Brayley's Seedling. Planted 1896. Bloom May 16th ; season, July 10th to August 1st. growth, 8 inches; yield, 5½ lbs. per bush.

Champion. Planted 1895. Bloom May 20th; season, July 25th to August 15th; growth, 10 inches; yield, 4 lbs. per bush.

Cherry. Planted 1896 Bloom May 12th; season, July 6th to August 31st; growth, 8 inches; yield, 5 lbs. per bush.

Collins' Prolific. Planted 1896. Bloom May 20th; season, July 20th to August 10th; yield, 5 lbs. per bush; growth, 12 inches.

Crandall. Planted 1897. Bloom May 18th ; season, July 15th to September 1st; growth, 18 inches ; yield, 8 lbs. per bush.

Fay's Prolific. Planted 1896; bloom May 12th: season, July 8th to August 1st; growth, 8 inches; yield, 3½ lbs per bush.

Lee's Prolific. Planted 1896; bloom May 20th; season, July 15th to August 10th; growth, 9 inches; yield, 3 lbs. per bush.

Naples. Planted 1895; bloom May 20th; season, July 12th to August 10th; growth, 9 inches; yield, 4 lbs. per bush.

New Victoria. Planted 1897; bloom May 16th; season, July 9th to August 1st; growth, 7 inches; yield, 3 lbs. per bush.

North Star. Planted 1896; bloom May 12; season, July 12 to August 15; growth, 9 inches; yield, 3½ lbs. per bush.

Pomona. Planted 1897; bloom May 16; season, July 11 to August 5; growth, 8 inches; yield, 4½ lbs. per bush.

Prince Albert. Planted 1895; bloom May 12; season, July 17 to August 20; growth, 9 inches; yield, 1 lb.

Raby Castle. Planted 1896; bloom May 15; season, July 12 to August 5; growth, 10 inches yield, 6 lbs. per bush.

Red Cross. Planted 1896; bloom May 16; season, July 12 to August 1; growth, 8 inches; yield, 5½ lbs. per bush.

Red Dutch. Planted 1897; bloom May 15; season, July 5 to August 1; growth, 6 inches; yield, 3½ lbs. per bush.

Red Victoria. Planted 1896 ; bloom May 16 ; season, July 9 to August 1 ; growth, 9 inches; yield, 6 lbs. per bush.

Saunders. Planted 1897; bloom May 20; season, July 15 to August 10; growth, 9 inches; yield, 4 lbs.

Versaillaise. Planted 1896; bloom May 12; season, July 7 to August 1; growth, 7 inches; yield, 3½ lbs. per bush.

White Grape. Planted 1896; bloom May 14; season, July 14 to August 7; growth, 7 inches; yield, 5½ lbs. per bush.

White Imperial. Planted 1896; bloom May 12; season, July 8 to August 1; growth, 7 inches; yield, 4½ lbs. per bush.

Wilder. Planted 1896; bloom May 12; season, July 8 to August 1; growth, 9 inches; yield, 7 lbs. per bush.

Descriptive Notes by A. W. Peart.

(Burlington Station.)

Currants were a good crop of fine quality. There was little or no mildew, but the currant worm was exceptionally troublesome, there being two broods here. By the judicious use of hellebore and Paris green, they were, however, kept pretty well in check. Neglected bushes were completely stripped of their leaves

Prices also were good, leaving a fair margin of profit. Of the newer varieties the Wilder still takes the lead, bidding fair to take a place alongside the Cherry and Fay's Prolific. Pomona also promises well. Collin's Prolific, a new black currant, has also come to the front, having fruited exceptionally well this season.

Belle de St. Giles.—Bush, medium in vigor, healthy and hardy, but not very productive; bunch, long and compact; berry, red, large, ½ inch in diameter, sub-acid, of excellent quality; season, medium, July 8th to August 1st. A large berry of fine quality, but not productive enough for a commercial plantation.

Black Victoria.—Bush, of medium vigor, healthy, hardy and productive; berry, large, ½ inch, firm, sweet, of fine quality; season, July 10th to August 5th. An early black variety.

Brayley's Seedling.—Bush, vigorous, healthy, hardy and productive; bunch, long, straggling, loose; berry, red, medium size, ⅜ inch, very acid; season, medium, July 10th to August 1st.

Champion.—Origin, England; bush, vigorous, healthy, hardy and moderately productive; berry, very large, ⅝ inch, black, somewhat acid; season, late, July 25th to August 15th; a late black variety.

Cherry.—Origin, Europe; bush, strong, upright, vigorous, hardy, healthy and very productive; bunch, somewhat short, compact; berry, dark red, firm, large, ½ inch, acid, of fair quality; season, medium, July 6th to 31st. One of the most profitable of the older commercial currants.

Collin's Prolific.—Bush, a very rank, strong grower, healthy, hardy and productive; berry, large to very large, ½ to ⅝ inches, black, firm, acid; season, July 20th to August 10th. The productiveness of this currant seems to increase with its age, its early years being more devoted to growth.

Crandall.—Bush, hardy, healthy, vigorous, rampant and very productive; berry, variable in size from ⅜ to ¾ of an inch in diameter, bluish-black, of a sprightly sub-acid flavor; season, July 15th to Sept. 1st. It ripens by degrees, some berries being green while others are quite ripe. Its commercial value requires further test.

Fay's Prolific.—Origin, New York, probably a cross between Cherry and Victoria; bush, a fair grower, hardy, healthy and productive; bunch, very long, somewhat loose; berry, large to very large, ½ to ⅝ inches, red, firm, sub-acid; season, medium, July 8th to August 1st. A profitable commercial currant in many localities.

Lee's Prolific.—Origin, England; bush, moderately vigorous, healthy, hardy and very productive; berry, black, very large, ½ to ⅝ inches, sub-acid; season, medium, July 15th to Aug. 10th. A good commercial currant.

Naples.—Origin, Europe; bush, strong, vigorous, hardy, healthy and very productive; berry, large, ½ inch, black, sub-acid; season, medium, July 12th to August 10. One of the best market varieties.

New Victoria.—Bush, vigorous, hardy, but not very productive; bunch, long, loose; berry, red, small to medium, ⅜ inch, acid, but pleasant in flavor, season, medium, July 9th to August 1st.

North Star.—Origin, Minnesota; bush, medium vigor, hardy, healthy and moderately productive; bunch, medium length, compact; berry, red, medium to large, ⅜ to ½ inch, acid, but sprightly and of good flavor; season, medium to late, July 12th to Aug. 15th. Has a commercial value as a late red currant.

Pomona.—Bush, vigorous, healthy, hardy and productive; bunch, long, compact; berry, red, large, ½ inch, acid, but of good quality; season, July 11th to Aug. 5th. This currant promises well.

Prince Albert.—Bush, vigorous, healthy and hardy; leaves large and deeply cut; bunch, short to medium; berry, small to medium, ⅜ inch, red, acid; season, late, July 17th to August 10th.

Ruby Castle.—Origin, Canada: bush, vigorous, hardy, healthy and very productive; bunch, short and compact; berry, red, small to medium, ⅜ inch, firm, acid; season, medium, July 12th to August 5th. An old commercial variety that is giving place to larger currants.

Red Cross.—Origin, New York, probably a cross between the Cherry and White Grape; bush, medium vigor and fairly productive; bunch, short and compact; berry, small to medium, ⅜ inch, red, firm, sprightly sub-acid; season, medium, July 12th to Aug. 1st.

Red Dutch.—Origin, Europe; bush, strong, healthy, hardy and productive; bunch, medium length, loose; berry, red, small, ¼ to ⅜ inch, sub-acid, of fine flavor; season, early to medium, July 5th to August 1st.

Victoria.—Bush, strong, hardy, healthy, vigorous, and very productive; bunch, long and loose; berry, large, ½ inch, bright red, tenacious, firm, acid, but of good quality; foliage, dark green, coarsely cut; season, medium, July 9th to August 1st. A good commercial currant.

Saunders.—Origin, Ontario; bush, strong, vigorous, hardy, healthy and productive; berry, black, large, ½ inch, of a good sub-acid flavor; season, medium to late, July 15th to August 10th.

Versailles.—Origin, France; bush, moderately vigorous, healthy, hardy and fairly productive; bunch, medium length and moderately compact; berry, red, medium size, ⅜ inch, not so acid as the cherry; season, early to medium, July 7th to August 1st.

White Grape.—Origin, Europe; bush of medium vigor and productive; bunch, long and straggling; berry, white, large, ½ inch, sub-acid, pleasant in flavor; season, medium to late, July 14th to August 7th.

White Imperial.—Bush, vigorous, hardy, healthy and moderately productive; bunch, long and loose; berry, white, large, ⅜ to ½ inch, of fine quality; season, medium, July 8th to August 1st. A fine dessert currant.

Wilder.—Origin, New York; bush, vigorous, hardy, healthy and very productive; bunch, medium length, compact; berry, red, large, ½ inch, sub-acid of good quality; season, medium, July 8th to August 1st. This variety has the best record of any of the red currants noted above.

Notes by A. E. Sherrington.

(*Lake Huron Station.*)

Champion.—Bush, strong and vigorous; berry black, large, flavor acid; yield 12 oz; two years planted.

Cherry.—Bush, strong, fairly vigorous, spreading; berry, very large, dark red; bunches short; quality good; yield 12 oz; three years planted.

Fay.—Bush, strong and vigorous grower; bunches short, compact; berry red, large to very large; quality of the best, yield 18 oz; three years planted.

Naples.—Bush, strong and vigorous, productive, berry large, black; quality good; yield 34 oz; two years planted.

Prince Albert.—Bush, strong, upright, vigorous; bunches small; berry red, medium; quality fair; yield 9 oz; one year planted.

Pomona.—Bush, strong, fairly vigorous; bunches, small; berry, red, large, quality good; yield 9 oz; two years planted.

Raby Castle.—Bush, strong; bunches long; berry, red, small and acid; yield 28 oz.; three years planted.

Versailles.—Bush, apparently vigorous; bunches, long; berry red, large; quality very good; yield 6 oz.; one year planted.

GOOSEBERRIES.

Notes by S. Spillett.

(*Gooseberry Sub-station*).

Of the English seedling, Autocrat, Ontario and Columbia deserve special mention. Autocrat gave a large crop of large, green, sweet berries as usual, but mildewed so early in the season that they were useless. Ontario and Columbia also gave a large crop of very large, yellow berries, but were destroyed by mildew. The foliage of these varieties suffered less from mildew than the other foreign seedlings and so have made a fair growth of wood.

Crosby's Seedling and Carnie's Golden did fairly, but, while the former is fairly vigorous, the latter makes wood slowly and is low and creeping in habit.

Queen, Chautauqua, Dominion, Triumph, Golden Prolific and Large Golden Prolific gave a little fruit which mildewed badly, as did the foliage, so they made little wood.

Of the pure English varieties, Whitesmith, taken all round in wood and fruit, is one of the best, if not the best. This season it bore as usual a large crop of fruit which was destroyed by mildew, but it is more vigorous than any of the others.

I may remark here that on light loamy soil this year I had no mildew either on fruit or foliage, while on heavy clay both English varieties and English seedlings mildewed badly. The same difference was apparent in the foliage of the young bushes in the nursery rows.

Keepsake, Lancashire Lad, Crown Bob, and Mrs Whittaker made very little wood as the foliage mildewed badly early in the season.

Of the pure *English varieties* imported in 1895, Green Chisel is by far the most vigorous and prolific. This variety this year yielded one and one half quarts to the bush, of large, greenish-white berries, of good quality: indeed this was all the bush could hold. Cook's Eagle, Ingram's Ocean, London, Lancelot, Red Champagne and Whinham's Industry hardly grow wood enough to keep alive. These all bore all they could carry this year of very large berries and were perfectly free from mildew. They are set in light, loamy soil, made rich and did not mildew.

The *American varieties* Red Jacket, Champion and Pearl, seem to me to fill the bill for culinary purposes; of these three, Red Jacket is the largest berry and the most vigorous. It gave four quarts to the bush and three quarts to the bush upon the ground, this year. This falling is caused by a small fly depositing an egg in the berry which develops into a grub, causing the berry to ripen prematurely and fall off. When picked just as the berry begins to color red we have no better fruit in our cellar. This fly never attacks the English varieties, they being too thick in the skin.

Champion is about as large as Downing but of the Houghton type, it is very vigorous and immensely prolific. Our bushes gave five quarts each, with from one to two quarts on the ground. This variety is very valuable for picking green as it is fully grown ten days or two weeks before any other variety. It never mildewed but once with us in ten years; this year it was perfectly clean, but it was picked off early, as it comes in at a season when nothing except rhubarb is obtainable.

Pearl is now too well known to need any description. Our bushes this year gave five quarts with from two to three on the ground, no mildew.

Spraying was practised this season with Bordeaux and Liver of Sulphur without any apparent good result. I shall thin out my bushes severely this fall and spray; and spray again during some mild day in winter with pure Bluestone water; besides spraying in spring before the leaf opens if possible. This cannot always be done, as a few warm days bring out the leaves while the soil is still soft. We have been canning English gooseberries for some years, or rather preserving them, and we prefer the Red Jacket and Pearl to the English varieties

Our fruit is pulled just as the fruit commences to ripen or when the seeds get dark colored. Of course if the fruit is used green for this purpose all varieties would be about alike; that is, very acid. No doubt the English varieties are larger, but the skin is very much thicker. Many people have sampled our preserved Red Jackets and Pearls and all have declared that they had no idea gooseberries were so fine. Several have declared that no more green gooseberries should be canned at their place. We would sell our English kinds any year and keep Red Jackets for our own use.

The Oregon Jumbo I am satisfied is a Red Jacket, and the Success a Downing.

Notes by A. E. Sherrington.

(Lake Huron Station.)

Crown Bob.—Bush, rather slow grower; not productive; fruit large and hairy; never yielded sufficient to record.

Downing.—Bush, strong and vigorous; productive; fruit, green and large; qualty good; yield four quarts per bush; three years planted.

Pearl.—Bush more spreading than Downing; strong and vigorous fruit, large, green; quality good; resembles Downing; yield two quarts; three years planted.

Red Jacket.—Is making a fine strong growth and yielded a few specimens; fruit medium to large, color red; quality good; one year planted.

Whitesmith.—Bush rather spreading, not as vigorous as it might be, subject to mildew; fruit large to very large, oblong, green; quality good; two years planted.

The yield of gooseberries would have been much larger had it not been for the extremely hot weather, which scalded the fruit so that one-half dropped off the bushes.

PEACHES.

Notes by W. W. Hilborn.

(South-western Station.)

In my report for 1899 I stated that the loss of peach trees in this district by winter killing would be from 90 to 95 per cent. I now believe this estimate to be rather under, than over, the truth. Most of the trees that survived were more or less injured, and quite a number are gradually dying. The centre, or heart wood, of the trunks and larger limbs of most of them, was injured to such an extent that they are not capable of bearing a heavy load of fruit, or withstanding strong winds, without sustaining considerable damage from broken limbs. From this cause also, the fruit on many of the trees did not properly develop and in many cases dropped prematurely. It was quite generally predicted that there would never again be as much land devoted to the peach as before the freeze out. Present indications, however, go to show that the area planted will soon be as large as ever. The orchards will not be as uniform as in the past, on account of such a large proportion of the young trees having been injured last season, as well as this, by fumigation.

It has been stated by many orchardists that a young tree would not grow well if planted in the same spot where the old one had been taken out. This is usually found to be true where we fill in here and there a tree in an old orchard. In resetting our orchards we have planted the trees, in some of the blocks, the same distance apart as they were previously; hence, the

young trees come in the same place previously occupied by the old ones. In other blocks, where all the trees were killed, we re-planted farther apart, therefore only a few were re-set in the place occupied by the old tree. I have not been able to see any difference whether the tree has been planted right where the old ones stood or half-way between.

Three trees each of 80 varieties were obtained last spring and planted. Most of these have lived and made a good growth. Those that came from the United States succeeded best. Very few of them died and most of them made a growth of from two, to three and a-half feet. The Canadian-grown trees were not as good; I think they were injured more or less by the winter and by fumigation. It is my opinion, based on observation, that peach trees that have been slightly injured by the winter, may be ruined by fumigation, while those which have not been thus injured will not be materially affected, and show no injurious results.

Three trees each, were planted last spring of the following:

Alexander,	Foster,	Niagara,
Amsden,	Family Favorite,	Orleans,
Ameliaberta,	Globe,	Orange Free,
Banner,	Geensboro,	Picquett's Late,
Bowslaugh's Late,	Garfield,	Reed's Early Golden,
Barnard's Early,	Hale's Favorite,	Smock,
Bokara,	Hance's Golden,	Sneed,
Beer's Smock,	Hill's Chili,	Smithson,
Brunson,	Holdenbaum,	St. John,
Beauty Blush,	Horton Rivers,	Stewart,
Bray's Rareripe,	Jacques' Rareripe,	Stephen's Rareripe,
Carlisle,	Klondike,	Scott's Nonpareil,
Carpenter's Seedling,	Keyport White,	Susquehanna,
Cline's,	Lee's Choice,	Snow's Orange,
Captain Ede,	Lemon Cling,	Stump,
Crosby,	Lemon Free,	Salway,
Connecticutt,	Late Crawford,	Tyhurst,
Carman,	Longhurst,	Townsend,
Chair's Choice,	Late Admirable,	Triumph.
Dewey,	Mountain Rose,	Troth's Early,
Elberta,	Millionaire,	Victor,
Essex Mammoth,	Marshall,	Wager,
Early Rivers,	Matthew's Reauty,	Wonderful,
Engol (Mammoth),	Morris White,	Wheatland,
Early York,	McIntosh,	Willett,
Early Crawford,	Moore's Favorite,	Yellow Rareripe.
Fitzgerald,	New Prolific,	

The following kinds fruited this season, but on account of the injury done by the winter of 1889, I cannot make the notes on varieties as complete as I desire.

American Apricot Peach.—Fruit medium size, round: color, yellow slightly blushed; good quality; pit free; ripe last of August; tree vigorous and moderately productive.

Brunson.—Fruit, medium to large: yellow with slight blush; quality good; pit free; ripens middle of September; trees, strong, vigorous and productive: promising for market.

Connecticut.—This variety is of the Early Barnard type, of which it is probably a seedling; not equal to that old standard sort in size or quality. The tree is hardy and productive and would no doubt be valuable for planting farther north where most kinds fail. The fruit is yellow, nearly covered with red; quite good in quality; pit free; ripens middle of September.

Crosby.—Fruit medium to large, roundish; yellow with cheek shaded red where exposed to the sun; flesh juicy, mild: quality very good; pit free. The tree is vigorous, hardy and very productive; as it gets aged it is apt to over-bear and the fruit run too small. If given good soil, well cultivated and severely thinned when required, it is a profitable market variety.

Champion.—Fruit large, roundish, creamy white with red cheek in the sun; quality very good; flesh juicy, adheres to the pit: ripe first of September; tree vigorous and moderately productive.

Crane's Yellow.—Fruit rather large, roundish, bright yellow with bright red cheek: quality 1st class; pit free. The fruit ripens about a week earlier than Early Crawford, or about the 25th of August; one of the most profitable varieties for home use and market: trees vigorous and productive.

Early Crawford.—Fruit large, roundish, slightly enlongated: color bright yellow with red cheek; quality very good; pit free; season last of August; trees vigorous and productive; buds rather tender and on this account not as reliable a cropper as many other kinds.

Elberta.—Fruit large to very large, oval, skin yellow with red cheek; quality very good: a splendid market sort. It is a good shipping peach, better in this respect than most varieties; trees only moderately vigorous, quite productive, not quite as hardy as most sorts. Perhaps its greatest drawback for this locality is that it suffers more from *leaf curl* than most other kinds.

Engle (Mammoth).—Fruit large nearly round, suture slight, skin yellow with red cheek ; flesh yellow, sweet and juicy ; quality very good ; stone small, free ; ripens early in September or between the two Crawfords ; keeps well after picking ; very promising for market and home use ; trees vigorous, healthy and productive.

Early Michigan.—Fruit medium to large, round ; color creamy white, mostly overspread and marbled with red ; flesh creamy white ; quality good ; pit nearly cling ; season middle of August ; trees hardy and productive but subject to *leaf curl.*

Early Rivers.—Fruit large, roundish ; skin creamy white, with faint blush where exposed to the sun ; flesh creamy white, quality good, very juicy, adhers considerably to the pit, rather soft for market ; quite subject to *fruit rot ;* tree vigorous, hardy and productive.

Fitzgerald.—Fruit large, roundish ; skin bright yellow with red cheek ; flesh yellow ; quality 1st class ; pit free, small. Ripens 1st of September ; tree quite vigorous, hardy and productive. Valuable for home use and market.

Foster.—Fruit large, of the Early Crawford type but more highly-colored ; quality very good, yellow, free stone ; ripens 1st of September ; tree vigorous but not productive.

Great Western.—Fruit medium to large, roundish ; color creamy white ; flesh white, juicy ; quality fair ; pit cling ; ripe second week in October ; trees only moderately productive ; of no special value here.

Greensboro.—Fruit medium to large, oblong, usually flattened ; skin green to creamy white, cheek slightly blushed in the sun ; flesh greenish white, juicy ; quality fair ; pit nearly cling ; ripe first week in August ; tree vigorous and apparently productive ; this, its first year of fruiting here, has not made a very favorable impression.

Golden Drop.—Fruit medium in size, round, skin a bright yellow, usually light red cheek where exposed to the sun ; quality very good ; a splendid canning peach ; pit small, free ; ripe after the middle of September ; tree hardy, vigorous and very productive ; fruit often requires thinning.

Kalamazoo.—Fruit medium to large ; skin yellow, considerably overspread with red in the sun ; flesh yellow ; quality very good ; pit free ; ripe last of September ; tree vigorous and productive ; promising for market and home use.

La Grange.—Fruit quite large, oval, skin creamy white ; flesh creamy white ; quality very good ; pit free ; ripens about the 10th of October ; trees quite vigorous, moderately productive while young

Lorentz.—Fruit medium size, roundish ; skin yellow, blushed in the sun ; flesh yellow ; quality good ; ripens after the middle of October ; rather late for this locality as it comes in after Salway and will not always ripen ; tree vigorous and moderately productive.

Late Crawford.—Fruit large to very large, roundish, somewhat enlongated ; color yellow, with red cheek ; flesh yellow, quality very good ; pit free ; ripe middle of September ; tree very vigorous but only moderately productive.

Lemon Free.—Fruit medium to large, oval ; color lemon yellow, sometimes a faint blush where exposed to the sun ; flesh yellow, quality good to very good ; one of the best for canning ; pit free ; ripens just after the middle to last of September ; tree very hardy, vigorous and productive ; this variety sometimes has the fault of dropping its fruit too readily at the ripening period.

Longhurst.—Fruit medium to large, oval ; color dark yellow with a dull red blush ; flesh deep yellow, quality good, rich ; pit free ; ripen middle of September ; tree very hard, quite vigorous and very productive ; liable to overbear, requires thinning, otherwise the fruit is apt to run small and the quality poor.

Marshall.—Fruit medium to large, roundish, slightly oblong ; skin bright yellow, slightly shaded red ; flesh yellow, red at the pit ; quality good, slightly inclined to acid, quite firm ; pit free ; trees vigorous but only moderately productive while young.

Mountain Rose.—Fruit medium to large, roundish ; color creamy white, considerably blushed and sprinkled with red ; flesh very juicy, creamy white, tender, melting, with a mild vinious flavor ; quality very good ; pit free ; ripe latter part of August ; trees quite vigorous and productive ; good for home use and near market, but not firm enough for distant market.

New Prolific.—Fruit large, roundish, slightly oval, skin yellow with red cheek ; flesh yellow, juicy ; flavor delicate, sprightly, vinous ; quality very good ; pit free ; tree vigorous and very productive ; a very promising market sort.

Namaper.—Fruit large, oval, about the size and form of Elberta, which it very much resembles also in color and quality ; ripens about a week later ; the tree however is much more vigorous and not subject to *leaf curl ;* very productive ; one of the most promising varieties for market among the newer kinds.

Oscar's Black Prince.—Fruit about the size and character of Alexander, much darker red in color, a little better in quality and ripens a few days later.

Pool's Large Yellow.—Fruit large, roundish oval, skin yellow, blushed red ; quality very good ; pit free ; ripe middle of October ; tree quite healthy and vigorous ; should it prove to be productive, on a more extended trial, it will become a profitable late market sort.

Piquett's Late.—Fruit medium size, roundish, skin yellow with red cheek, flesh yellow, red at

the pit ; quality poor to fair : pit cling ; trees vigorous and very productive : not valuable on account of poor quality and clinging so tenaciously to the pit.

Pearce.—Fruit large, golden yellow with slight blush where exposed to the sun : quality very good ; pit free ; ripe about the middle of September : tree vigorous and productive : this sort promises to be a valuable market variety.

Piquett's Free.—Fruit medium to large, roundish, skin yellow, blushed red where exposed to the sun : flesh yellow, quality very good : ripens about the 10th of October ; pit free : tree vigorous and only moderately productive while young.

Roser.—Fruit small to medium, roundish : skin, white : flesh white ; pit free : quality poor ; tree vigorous and productive : of no value on account of small size and poor quality.

Red River.—Fruit large, roundish, oval : skin, creamy white with fine red cheek : flesh creamy white, juicy, fine grained with pleasant vinous flavor : pit nearly free : quality, good : ripe early in August ; tree hardy, vigorous and very productive : it resembles Early Rivers in every respect, except that it is much more highly colored.

St. John.—Fruit large, roundish, slightly oval : skin, bright yellow with bright red cheek ; flesh yellow, juicy, very fine flavored, quality 1st class ; pit free ; ripens middle of August ; tree vigorous and productive The first good yellow freestone peach to ripen : one of the best for home use or market.

Salway.—Fruit large, roundish : skin yellow with a red cheek in the sun : flesh yellow, red at pit ; quality very good : pit free ; ripens middle of October : tree vigorous and very productive ; nearly always ripens in this locality ; perhaps the best late market sort ; too late to plant farther north.

Summer Snow.—Fruit medium, roundish ; skin white : flesh white : quality poor to fair ; pit, cling : ripens middle of October ; tree vigorous but not very productive : I do not consider it of any value for Ontario.

PEARS.

Notes by Harold Jones, Maitland.

(*St. Lawrence Station.*)

Bergamot —Planted in 1896 ; made a fairly vigorous growth, healthy ; blossomed May 25th set no fruit.

Bessemianka.—Planted 1896 ; made a fair growth ; one tree died of blight and another is going the same way ; blossomed May 25th ; set no fruit.

Baba.—Planted 1897 ; all trees have died in spring of 1899 and 1900 of blight.

Dempsey.—Planted 1896 ; makes a fairly vigorous, upright growth, healthy ; blossomed May 24th ; no fruit.

Goodale.—Planted 1896 ; makes a good strong growth, healthy ; blossomed May 23rd ; no fruit.

Japan Golden Russet.—Planted 1897 : makes a slow growth : fairly healthy ; blossomed May 25th ; ripe October 10th, first crop, two pears ; fruit small, $1\frac{3}{4} \times 1\frac{1}{4}$, oblate, stem $1\frac{1}{2}$; color, bright yellow ; quality, poor.

Keiffer's Hybrid.—Planted 1896 : a strong, healthy grower, tree upright, foliage healthy : blossomed May 25, ripe October 10th ; second year of bearing about 30 pears : quality fair to good ; one of the most successful varieties and worthy of planting where less hardly varieties fail. Season of use November.

Petite Marguerite – Planted 1898 : a good, healthy grower, making a close upright head ; foliage healthy ; blossomed May 24th, fruit set and almost came to maturity when blown off in a severe storm ; crop two pears.

By A. W. Peart, Freeman.

(*Burlington Station.*)

The pear trees planted in 1896 and subsequently have made a reasonably good growth, very few have died. The orchard is ploughed in the spring and tomatoes, potatoes or some other vegetables will be grown in it until the trees require all the soil.

The land is kept in good heart by using stable manure which is ploughed under, also muriate of potash and bone meal, each at the rate of 125 lbs. per acre. The two latter manures are applied for the benefit of the trees solely, being sown around them after the ground is ploughed and then harrowed in. The stable manure is used for the vegetable crop.

Pruning is done in March or April, cutting the young shoots back so as to make the trees stout, stocky and lower. There was very little blight and the pear slug was not as plentiful as usual. Prices were fair, ranging from $3 to $6 per bbl., according to variety and quality.

Anjou.—Planted 1880 ; in full bloom May 16th ; season, November-December ; growth, 14 inches ; yield, 48 qts. per tree : when picked too soon this pear shrivels up and does not properly mature. It also drops too easily from the tree and when you go to pick them at the proper time you find too many on the ground. It is a good export pear. Picked Oct. 1st , selling price, $3.50 to $4.50 per barrel in Montreal.

Bartlett.—Planted 1880; in bloom May 19; season, September; growth, 12 inches; yield, 64 qts.; somewhat subject to blight. When picked, packed and shipped properly it is our best export pear. It, however, requires efficient cold storage. Picked Aug. 25; price, $4 to $5 per barrel.

Bartlett-Seckel.—Planted 1898; growth, 16 inches; tree an upright grower.

Beurre Bosc.—Planted 1896; bloom, May 17; growth, 16 inches; no fruit yet; tree an upright grower.

Beurre Giffard.—Planted 1896; bloom May 16; very vigorous grower, 24 inches; tree spreading in habit; has not fruited.

Buffum.—Planted 1897; bloom May 16; growth, 18 inches; upright; no fruit.

Clairgeau.—Planted 1896; bloom May 19; season, November; growth, 12 inches; yield, 3 qts.; tree upright grower; picked Oct. 15.

Clapp's Favorite.—Planted 1889; bloom May 19; season, late in August to early September; growth, 18 inches; yield, 32 qts.; a strong upright grower, very subject to blight; a large, valuable pear for home markets; picked August 20th; price, 50c. per basket.

Dempsey.—Planted 1898; growth, 12 inches.

Doyenne Boussock.—Planted 1896; bloom May 19; growth, 14 inches.

Duchess.—Planted 1889; bloom May 15; season, October-November; growth, 10 inches; yield, 18 qts. Duchess pears are grown here both as standards and dwarfs, the latter on the quince root. The dwarfs do very much better. This variety is also subject to blight. A fine export pear. Picked Sept 15th; price, $3.50 to $4.50 per barrel.

Easter Beurre.—Planted 1897; bloom May 16; growth 20 inches; spreading.

Flemish Beauty.—Planted 1880; bloom May 19; season, September, a week to 10 days later than the Bartlett; growth, 10 inches; yield, 64 qts. The leaf and fruit generally spot badly. This year, however, there was very little scab. Fine for export when the fruit is clean. Picked Sept. 5th; growth, 10 inches; yield, 64 qts.

Howell.—Planted 1896; bloom May 18; season, September-October; growth, 18 inches; yield, 2 qts.; picked. Sept. 20th; price, 45c. per basket.

Idaho.—Planted 1896; no bloom yet; growth 14 inches; some blight.

Josephine De Malines.—Planted 1896; bloom May 18; growth, 16 inches; spreading.

Keiffer.—Planted 1899; bloom May 16; season, October-November; growth, 24 inches; yield, 8 qts; a very rapid, strong grower and bears young. It appears to be well adapted to lighter soils. Not subject to blight. Picked, Oct. 1st; price, 40c. per basket.

Lawrence.—Planted 1896; bloom May 16; season, December; growth, 24 inches; spreading; yield, 1 qt.

Lawson.—Planted 1896; no bloom yet; growth, 20 inches.

Lincoln.—Planted 1898; growth, 22 inches.

Louise Bonne.—Planted 1897; bloom, May 16; growth, 10 inches; no fruit yet; spreading habit.

Osbands' Summer.—Planted 1897; growth 16 inches; upright; some blight.

Petite Marguerite.—Planted 1899; bloom, May 17; season, August; growth 20 inches; yield 3 quarts

President Drouard.—Plated 1897; bloom, May 16; growth, 18 inches. upright; no fruit yet.

Seckel.—Planted 1897; growth, 16 inches.

Sheldon.—Planted 1889; bloom, May 15; season, Oct.-Nov.; growth, 14 inches; yield, 32 quarts; a pear of fine quality and brings good prices in home markets; appears to be useless for export, going to pieces in transit. Like the Anjou it drops too easily from the tree; price, 45 cents per basket.

Souvenir de Congres.—Planted 1896; bloom, May 18; season, Aug-Sept., growth 24 inches; upright.

Sudduth.—Planted 1897; growth, 12 inches; spreading in habit.

Summer Doyenne.—Planted 1896; bloom, May 16; growth, 18 inches; upright; no fruit yet

Tyson.—Planted 1897; growth, 18 inches, upright.

Vermont Beauty.—Planted, 1896; bloom, May 18; growth, 16 inches, upright.

Wilder.—Planted 1896; bloom, May 18; growth, 24 inches, upright.

Winter Nelis.—Planted 1896; bloom, May 18; season, December; growth, 16 inches; spreading; yield, 1 qt.

French Pears.—Received in June and planted at once the following pear trees: Bergamotte Esperen, Bonne de Malines, Citron de Carmes, Dr. Jougré, Dr. Jules Guyot, Figue d'Alencon, Marguerite Marillard, Nouvelle Fu vie, Olivier de Sevres, Souvenir le Venerable, De La Salle, Triumphe de Jodoigue. These were cut back severely, and all lived and made some growth. Dr. Jougré and Bonne de Malines made over one foot each of new wood.

PLUMS.

Notes by John Mitchell.

(Georgian Bay Station.)

This has been the most complete "off" year in the fruit business ever experienced in the history of this district. In plums there is nothing new to report. Only six baskets, mostly Red June and Chabot, which are Japan plums, with a few scattered specimens of other kinds, were gathered from twelve hundred trees.

The cause for this, in my opinion, and that also of the most experienced fruit growers here, was not the cold, but the high temperature in February, which caused the sap to start and swell the buds, which froze later on, thus bursting or practically bursting them, as was apparent by the weak blossom made, buds and all falling from the trees in a few days without setting fruit. The trees, however, are looking exceptionally fine this fall, having made splendid growth and ripened their wood well.

American Plums.—These plums will be of no commercial value here, but might be of some use in home gardens farther north, where European and Japanese varieties will not succeed. The best of this class so far tested are Cheney, Weaver and Pottawattomie.

Japan Plums.—These plums are proving sufficiently hardy for the Georgian Bay district, but are of such indifferent quality compared with our best European varieties that it would not be wise to plant them extensively. The best so far tested are Abundance, Burbank, Red June, Orient and Chabot. The Ogon and Willard have also been tested, but are of very poor quality, not worthy a place in any Canadian orchard.

Peaches. Of the few peaches tested at this station, Triumph, Tyehurst, Bowslaugh's Late, and Bokara are proving hardy. The three first mentioned bore quite full crops the past season. They are freestone, yellow flesh and very good quality, and I think will succeed well here.

Insects and Fungi.—Of all the insects that gave trouble during the season none were so destructive as the tent caterpillar of the forest, or more properly called the forest caterpillar, as it seldom spins a true tent, although they have a habit of leaving a thread of silk wherever they go and drop themselves to the ground thereby. Various remedies have been tried, such as destroying the eggs, which is good as far as it goes. Spraying the caterpillars when in bunches with coal oil will kill them, but in about a year there will be found a patch of dead bark about the size the bunch of worms were when sprayed. Better crush them with an old broom or any other thing: it is about as quickly done as any method. We have killed them quite effectively by spraying with Paris green perfectly, saving our orchard when other orchards were almost destroyed.

The apple scab seems to be completely controlled by spraying with Bordeaux mixture, as we have had none for two years.

It is also a remedy for shot hole fungus. Our trees are carrying their foliage healthy and green up to November.

Notes by Harold Jones.

(St. Lawrence Station.)

Abundance.—Planted 1896; made a vigorous growth, forming a compact, upright head foliage and stem fairly healthy: one tree died this summer, cause unknown: blossomed May 20th, blossoms were all injured in the pistil by spring frosts: no fruit set; this variety has up to the present proved undesirable for this section.

Burbank.—Planted 1899: made a fair growth, spreading: foliage and tree healthy; blossomed May 23rd, fruit ripe August 31st, size 1½x1½, color bright red over yellow, stone small cling, suture distinct, quality good.

Communia.—Planted 1896; made a fairly vigorous, spreading growth: foliage shows signs of shot hole fungus; tree healthy; blossomed May 23rd, ripe September 10th; size 1¼x1½, color purple, suture obscure, stone medium, cling, flesh pink, flavor good.

Col. Wilder.—Planted 1898: tree healthy and vigorous, compact, spreading: blossomed May 25th, ripe September 20th: fruit round, small 1x1: color, red: cling stone: of inferior quality and not desirable where the European plums will succeed.

Chas. Downing.—Planted 1896: makes a fair spreading to drooping growth: foliage subject to plum pocket and fungi; blossomed May 26th, a few blossoms set: ripe September 30th: size 1¼x1½: color bright red: suture obscure: stone medium cling: thin skin; flavor sweet, no astringency; an improvement over the wild type, but not desirable.

Forest Rose.—Planted 1897: makes a very vigorous growth; blossomed May 24th: ripe September 25th: size 1¾x1½: color red, some greyish bloom: suture obscure: stone, medium cling; flavor sweet, no astringency; skin tough; flesh pink, tough, not desirable.

Forest Garden.—Planted 1897: made a vigorous growth upright: blossomed May 24th: ripe September 25th; color red, with greyish bloom: suture obscure: stone medium, cling: not desirable.

Genii.—Planted 1896 ; makes a very vigorous strong growth ; upright ; blossomed May 21st ; ripe September 4th ; size 1½x1⅝ ; suture distinct ; color blue ; stone medium, semi-cling ; flesh yellow, tender, good ; skin thin ; one of the best that has fruited with me.

Grand Duke.—Planted 1896 ; makes very healthy, strong growth ; foliage a beautiful dark green and very healthy and free from insect and fungi pests ; so far the healthiest of all plums grown at the station ; blossomed May 23rd ; ripe October 6th ; size 1⅝x1¼ ; color, purple, covered with grey bloom ; suture visible ; stone, medium cling ; flesh, sprightly acid ; skin, thin ; quality, good ; keeps well after picking.

Hammer.—Planted 1896 ; makes strong vigorous growth ; foliage healthy, some injury from aphis ; blossomed, May 25th ; ripe, September 24th ; size, 1¾x1¼ ; color red, covered with greyish bloom ; suture obscure ; stone medium, cling ; flesh, sweet ; skin, tough and acid ; a very good plum of its class, but not desirable where the Europeans can be grown.

Lombard.—Planted 1896 ; makes a strong vigorous growth ; foliage healthy, subject to aphis ; tree subject to black knot, but generally clean and healthy ; blossomed May 20th ; ripe, September 12th ; size, 1½x 1 7-16 ; color, purple ; suture distinct ; free stone ; medium size ; fruit affected by plum rot, where borne in clusters ; a heavy and early bearer ; desirable.

Milton.—Planted 1896 ; a vigorous healthy tree ; foliage healthy ; blossomed May 26th ; ripe, August 20th ; size, 1½x1 ; color, red ; suture obscure ; stone medium, cling ; valuable on account of its earliness.

Tatge.—Planted 1896 ; a very vigorous healthy tree ; foliage healthy ; bloomed May 20th; ripe, September 15th ; size, 1⅝x1¼ ; color, purple ; suture distinct ; stone medium, cling ; good ; fruit badly affected by plum rot ; not equal to Lombard.

Whittaker.—Planted 1896 ; makes a very strong vigorous tree ; foliage healthy ; blossomed May 27th ; ripe, August 30th ; size, 1⅜x1 3-16 ; color, bright red and covered with yellow dots; suture obscure . slightly pointed ; stone medium cling ; quality inferior ; not desirable.

Weaver.—Planted 1896 ; makes a very strong growth, but subject to have limbs die ; foliage healthy ; blossomed May 23rd, but fruit did not mature.

Wyant—Planted 1898 ; tree a slow, compact grower ; blossomed may 25th ; ripe September 21st ; fruit round, small 1 x1 ; color red ; cling stone ; not desirable where Europeans can be grown.

RASPBERRIES.

Notes by A. W. Peart,

(Burlington Station.)

Under test at this station are : All Summer, Columbian, Conrath, Cuthbert, Eureka, Gault, Golden Queen, Gregg, Hilborn, Japan Wine, Kansas, Kenyon, Lotta, Loudon, Lovett, Marlboro, Miller Mills, Ohio, Older, Palmer, Phœnix, Progress, Redfield, Reliance, Shaffer's Colossal, Smith's Giant, Royal Church, Souhegan, Thompson and Winant.

Of these, the old Marlboro still takes first place as a commercial variety. It requires, however, careful manuring and cultivation to ensure good canes, as it is a light grower. Alongside of this the Miller, a new variety of the same season, seems to stand. The Loudon, a new variety here, of same season as the Cuthbert, competes with the latter as a late berry, although like the Marlboro it grows a somewhat light cane. So far the above four stand at the head of the red varieties.

Of the *Purple sorts* the Columbian leads, being both hardier and more vigorous than the Shaffer. Both are productive.

Among the *Black varieties* Smith's Giant, Kansas and Older take the lead in the order named. Kansas is slightly subject to the rust, otherwise it has a fine record. Smith's Giant is a very strong, vigorous grower, hardy and productive, ripening from a week to ten days later than the Kansas.

Of the *Yellow varieties* Golden Queen is without doubt, the best. All Summer is peculiar in that it fruits along from early in July until the first frosts come. That is a reason, however, why it has no commercial value, as at no time is there very much fruit on the bushes, and besides, "everything in its season." Japan Wine, while a curiosity on account of its striking appearance, is of no use commercially, since it is not productive, and freezes to the ground every winter. Japan Mayberry froze out as well as Eureka.

As with the blackberries, the raspberries are banked up with the plough in the fall. During the following season the cultivator should be kept going until the fruit ripens. Summer pruning is done in late July and early August, cutting the ends of the new canes back to make them stocky and throw out side branches. The annual pruning is made in March, removing the old canes, thinning out the new ones, and cutting back those left, as well as the laterals, where necessary. Nitrate of soda is applied in the spring, 200 pounds per acre, just after growth is started. It should be sprinkled adjacent to, but not in contact with the roots, as it is very strong and concentrated. My practice is to scatter it along each side of the row, fairly close, then work it in with the hoe and cultivator. Prices of reds averaged about 10 cents, of black and purple 8 cents, and of yellow 6 to 7 cents.

NOTES BY A. E. SHERRINGTON.

(*Lake Huron Station.*)

In this district the raspberry crop was a very disappointing one this season. The extremely hot and dry weather during June and July literally dried the fruit up before being fully matured, and a large number of varieties have failed entirely, showing a weakness in vigor and constitution. A new plantation will be set out next spring of such varieties as have shown by their vigor, hardiness and productiveness to be worthy of further trial, and all inferior varieties will be discarded.

All Summer.—Plants hardy and healthy, of dwarfish habit, very bad for suckering; fruit ripening all through the summer, making it impossible to keep record of yield; will be discarded.

Brandwine.—An early red variety, rather weak in growth; very small and soft; quality medium; yield 5¾ quarts; ripe July 8th.

Caroline.—Plants hardy, healthy and vigorous; fruit yellow, small and very soft, of the poorest quality; yield 12¼ quarts; ripe July 16th; will be discarded.

Cuthbert.—Canes strong, healthy, hardy and vigorous; fruit dark red, large, firm and of the very best quality; yield 8½ quarts; ripe July 16th; the best variety under cultivation.

Carpenter's Early.—A black cap of rather weak growth, and a little tender; berry medium to small; quality fair; yield 2½ quarts; ripe July 16th.

Conrath.—Plants strong, vigorous and hardy; berry large; color black; quality good; yield 8½ quarts; ripe July 16th; a very promising variety.

Columbian.—Plants not so vigorous as represented; a little tender; fruit large, firm; fair quality; color purple; yield 4½ qts., ripe July 24th.

Golden Queen.—Plants strong, healthy and vigorous; fruit yellow, large, firm and of good quality; yield 4 quarts; ripe July 18th; the best light colour variety.

Marlboro.—Plants of dwarfish habit; canes strong, fairly hardy; fruit large, firm; color bright red; fair quality; yield 9 quarts; ripe July 8th.

Miller.—A red variety of great promise; plants hardy and quite vigorous; berry medium and large, firm of very good quality; yield 8 quarts; ripe July 12th.

Older.—Plants spreading, moderately vigorous and hardy; fruit large to very large, black and of good quality; yield 12¾ quarts; ripe. July 16th; very promising.

Ohio.—Plants half hardy, moderately vigorous; fruit, medium, black; quality good; yield 2¾ quarts; ripe July 16th.

Progress.—Plants medium in vigor, hardy; fruit, small; quality not good; yield 1½ quarts; ripe July 16th.

Phoenix.—Plants moderately vigorous, hardy and healthy; color bright red; berry medium to large, firm; quality good; yield 14¾ quarts; ripe July 18th; a good one.

Redfield.—Plants good growers and hardy; fruit small, soft and of the poorest quality; color purple; yield 1 quart; ripe July 16th; will be discarded.

Reliance.—Canes small and weak; fruit small and soft; quality medium; yield 5½ quarts; ripe July 8th.

Smith's Giant.—Plants very vigorous; canes strong, moderately hardy and productive. fruit borne in clusters of the largest size; black; quality good; yield 9¼ quarts; ripe July 17th

Shaffers Colossal.—A strong, vigorous grower, rather tender for this district; fruit large; quality good, a little tart; color, purple; yield 5 quarts; ripe July 16th.

Sonhegan.—Plants moderately vigorous, rather tender; fruit black; quality medium; berry medium to large; yield 2¼ quarts; ripe July 16th.

Turner.—Plants hardy, healthy, moderately vigorous; fruit red, rather small; quality good; yield 8 quarts; ripe July 8th; one of the best early varieties.

Thompson.—An early red variety, hardy, healthy and fairly vigorous; fruit a little soft, fair size, quality very good; yeild, 3¾ quarts; ripe July 8th.

Taylor.—Plant a rather weak grower, half hardy; fruit black, small and soft, quality medium; yield 2¾ quarts; ripe July 16th.

Varieties that have failed.—Brinckle's orange, Hansell, Loudon, Rancocas, White Champlain, Superlative, Gregg, Gault, Kansas, Lovett, Lottie, Mammoth Cluster, Pioneer.

STRAWBERRIES.

NOTES BY E. B. STEVENSON.

(*Strawberry Sub-station.*)

The season that has just passed was on the whole a favorable one. The spring was somewhat late and shortly after spring opened up dry weather set in and May and June were dry. Thus, though the vines came through the winter in good shape, there was a lack of the necessary moisture for the plants to do their best and yield as large a crop as they were capable of doing under more favorable circumstances, so that the picking season was considerably shortened on

this account. But, on the other hand, the prices were good throughout the whole picking season. Thus, though the crop was not as large as some seasons, the prices were considerably above the average, the growers making as much, if not more, out of their crop. There was very little rust on any of the kinds.

Several new varieties have been offered to the public and very great claims made for them. Among the early ones it is claimed that Johnson's Early and August will take the place of Michel's Early and Beder Wood and those of the Crescent family. I have both this kinds in my trial plot and will be able to report on them next season, both have made a good growth; also among the late varieties we have the Klondike that will come in competition with the Woolverton, Brandywine and Gandy, but it will be a difficult matter to displace these fine late sorts from their position as the best of the late kinds. Among the other new ones that are very highly spoken of are the Miller, Salem, Senator, Dunlop, Gibson, Pennell and others, I will be able to report on these after the next fruiting season. The old standards did well viz: Bubach, Haverland, Clyde, Warfield, Williams, Saunders, Van Deman. The Bubach plant is weakening, not as vigorous as it was a few years age.

Annie Laurie—(Perfect). Very best quality; fine bright large berry: not productive enough to grow for market.

Bubach No. 5.—So well known that it needs no description, save to say that it did well, held its place as one of the largest berries.

Benoy (Perfect).—This is a seedling of Mr. Benoy of Indiana, from Bubach & Jessie. Plant strong, good grower, healthy, no rust; the berry is large, good quality: it did well the past season.

Bismarck (Perfect).—Plant resembles the Bubach, its parent, very much; a good grower, healthy: berry very large, roundish, and beautiful looking; a good variety, well worth growing.

Bird (Imperfect).—A seedling of Manchester and Mt. Vernon, grown by W. F. Bird, of Ann Arbor, Mich. A very strong, healthy grower: runs well: the berry is good size, roundly conical: productive: good quality.

Boynton (Imperfect).—This is no doubt a seedling of the Crescent, which it very much resembles both in plant and berry and style of growing and season of ripening almost identical with Crescent.

Brandywine (Perfect).—A very vigorous, strong grower, making wide row: healthy plant: fruit large, firm and best quality, with some people not as productive as it is on other soils, but a satisfactory variety on the whole.

Bubach No. 3298.—A seedling of Bubach, from the Missouri Experimental Station: the plant resembles its parent very much, healthy, good grower, plant vigorous: fruit large: not as productive as Bubach.

Clyde (Perfect).—The most favorable reports from all quarters come speaking very highly of the Clyde: I have now fruited the Clyde for seven or eight years and I still consider it the best of all for the market grower. I find in some sections it is not very well known, but where well known it is being grown altogether. The plant is the strongest and healthiest, good grower, makes lots of plants, very productive and the berry is the largest, good quality and firm enough to ship; as firm as the old Crescent. I consider this the most profitable variety for the market grower; it is early, ready to pick two or three days after the Michell.

Clyde No. 800 (Perfect).—A seedling of the Clyde, grown by E. B. Stevenson of Ontario. The plant is strong, vigorous and healthy resembling its parent: productive: would like to give another year's trial before reporting on it.

Carlie (Imperfect).—This variety is of the Haverland type; both plant and berry resembles the Haverland; it bore a very good crop of large long berries a little firmer than Haverland.

Crescent No. 1801 (Imperfect).—This is a seedling of the Crescent, grown by Horticulturist at Experimental Station of Missouri and sent to me for trial. The plant is very much like the Crescent. The berry is somewhat firmer and later; it did well the past season.

Cobden Queen (Perfect).—Seedling of Wilson, by John McCaffrey of Illinois; a good, healthy grower; making plenty of plants; fairly productive the past year.

Downing's Bride (Imperfect).—The plant is a strong grower and healthy and quite productive; the berry is large, regular in shape, conical, bright red and good quality; well worth a trial by growers.

Eleanor (Perfect).—Very early; productive; dark in color; a very good early sort.

Earliest (Perfect).—This very much resembles the Michell's Early in every respect; in fact it would be hard to point out any difference between them. It no doubt is a seedling of Michell's Early.

Excelsior.—This variety was greatly praised on its introduction as a very early berry; it is early, but it is very poor in quality; the plant is small, making many plants; the fruit is medium to small in size; fairly firm, round in shape, medium in productiveness; no good reason that I can see why it was put on the market; many others much better.

Emperor (Perfect).—This is a seedling grown by the late John Little of Granton, Ont., and introduced by M. Crawford of Ohio; a strong, healthy grower; plant shows no rust; the berry is large, bright, somewhat irregular; at least the first berries are medium in productiveness; mild, pleasant flavor; will be grown by those desiring large, fine looking fruit.

Empress (Perfect).—This is also a seedling of the late John Little's, also introduced by Mr. Crawford; it is very similar to the Emperor in most respects; same in shape, a little darker in color, and perhaps better flavor; well worth a trial.

Geisler (Perfect).—This variety again has done well: it is one of the first in bloom: the flowers are very rich in pollen: plant is strong, vigorous and healthy: the berry is large, long and blunt at the end, resembling the old Mary; a good one for fertilizing early blooming pistillates.

Glen Mary (Perfect).—This has done well again this year: plant healthy, strong grower and vigorous; bore a large crop of immense sized berries: sometimes the end of the berry is hard and green and seedy, which is against its appearance, not first-class in quality, but is one of the largest berries now grown.

Greenville (Imperfect).—This variety has done well, producing a good crop of fine-looking berries; it has succeeded well wherever tried; no mistake can be made in planting the Greenville.

Gladstone.—A good grower: plant healthy: berry large, and good flavor: desirable.

Haverland (Imperfect).—An old stand-by: has done well this year: does not seem to lose any of its vigor: bore a large crop of finest berries; it is so well known that it needs no description from me

Hall's Favorite (Perfect).—A good grower and healthy plant: berry is of the Splendid type; quite productive: it is not as good a variety as the Splendid.

Hunn (Imperfect).—A seedling sent out by the New York Experiment Station; the plant is a strong one and good grower: its greatest and perhaps only fault is that sometimes it rusts quite badly, though in some places report says it does not rust at all. It is a very late variety; good bearer: the berries are dark red in color, roundish in shape, quite firm and fair quality.

Jersey Queen (Imperfect).—Plant strong and healthy; no rust ever on it: the plant bears a good crop when properly fertilized: it is very late in ripening; the berry is large roundish in shape: bright color with golden seeds; one of the most desirable late sorts; the quality is good; well worth growing for market.

Jerry Rush (Perfect).—A seedling of Bubach and Jessie: grown by Mr. Benoy of Indiana; plant a strong healthy grower; makes plants freely: the berry is large, roundly conical: good bright crimson in color, good flavor and fairly productive: it is very highly spoken of by some growers.

Klondike (Perfect).—The plant is a good grower and bore a large crop; it belongs to the late ones; it is fairly productive for a late one and will be useful as a fertilizer for late varieties as Gandy, Jersey Queen and Hunn. The berries are not as handsome in appearance as Gaudy and Jersey Queen, but it will prove a useful variety for those who wish to grow late sorts.

Lovett (Perfect).—A strong grower, generally healthy, had some rust the past season; quite productive; berry conical, firm and good color, fair quality: there are others I consider better than this one, it does very well on some soils

Leo.—This variety did not do well this year. I will give it a further trial and report.

Lord Sheffield (Perfect).—This is an English variety: it is an extra early and a very good one. The plant sometimes rusts, but makes a good growth of plant: the berry is roundly conical, large, bright red; quite productive: a fine early variety, larger and more productive than Michel and quite as early.

Margaret (Perfect).—One of the best crops of strawberries I ever saw was on the Margaret. The plant is strong, healthy and vigorous, it did very well this year again: does its best in very rich soil and well repays any extra work you may give it: finest berries bringing highest price: I would like to make its excellencies known more widely than they seem to be.

Marshall (Perfect).—The Marshall does not make many plants: perhaps enough for fruiting: the berries are fine and very large, ripening quite early, the earliest very large variety: this is a good variety for amateurs to grow, who can give an extra amount of petting to it: not profitable for market growers

Michell's Early (Perfect).—This variety is being discarded by most growers, still it bears paying crops on some soils, growers saying they can make as much out of the Michell as any other, on account of its earliness and because it ships well. Sometimes late frosts catch the blossoms and thus ruins the crop. The Michell is being replaced in many places by the Clyde.

Maximus.—I would like to give this another trial before reporting on it. I do not believe it did its best the past year: it has good points about it: I will try it another year.

Mastodon (Imperfect).—This variety did well, bearing a good crop of the largest and finest berries: plant strong, healthy, berry very large, bright scarlet in color: medium in firmness: good quality; a very desirable sort.

Morgan's Favorite.—Plant is large and healthy, does not make many plants, is quite productive: the berry is conical in shape and bright red in color and fine flavor; worth a trial.

McKinley (Perfect).—This new variety did very well the past season. The plant is strong and vigorous as well as healthy and quite productive: the berry is good size, of conical shape, good color, firm and fine; it is worth giving a trial: I believe it will prove desirable.

Nick Ohmer (Perfect).—This is a good one ; the plant is healthy, strong and quite vigorous, making plants freely that take root without any difficulty ; it is an ideal plant maker. The fruit is large in size, conical in shape, firm and very good quality ; the plant is quite productive. It wants good soil and good cultivation and will repay such favors ; would advise growers to try the Nick Ohmer.

Noble (Perfect).—The plant is healthy and fairly vigorous ; does not produce enough to make it profitable ; the fruit is very large, roundish, bright red in color, firm and very good quality. It is an English variety, grown by Mr. Saxton, of England.

Pride of Cumberland.—A desirable variety, judging from once fruiting. The berry is large; good color ; firm. The plant is productive ; I believe it is a good one ; will give further trial.

Ruby (Perfect).—This one has done well with me ; it has had a large crop of very fine berries ; the plant has some rust ; the berry is conical, large, firm and good quality ; it is a mid-season variety.

Ridgeway (Perfect).—This has not done at well with me as in some other places ; it has not been productive enough ; some growers speak very highly of it ; it has failed with me ; will give a further trial.

Smith's (Perfect).—This is of the Michell type ; plant healthy, good grower, making plants freely ; very early, as early as the Michell ; only medium in size, but fairly productive for so early a variety ; I like it better than the Michell for an extra early.

Saunders (Perfect).—This one has done well again this year as indeed it has always done since I first tried it some five or six years ago. It is not so well known as the Williams, but it is a better sort than the Williams in several respects. It has a stronger plant. The berry ripens all over better than the Williams ; it is of the same season, ripening at same time ; would advise those who like the Williams to try the Saunders ; it is a seedling grown by the late John Little, of Ontario.

Seaford (Perfect)—The good things I said of the Seaford I repeat and add to—it is a variety that has taken first rank wherever it has been grown ; the plant is a strong and healthy grower ; quite vigorous ; the berry is large, good color, quite firm and very good quality ; the plant is very productive ; it is one of the best.

Sharpless (Perfect).—Did fairly well, as well as it ever does ; it is too shy a bearer ; the fruit is large and of best quality.

Star (Perfect).—Plant healthy ; good grower ; it is very like the Sharpless ; I do not think it is any improvement on the old Sharpless.

Sunrise (Perfect).—This failed again to do even fairly well ; will drop it for the future.

Splendid (Perfect).—Did very well ; it is early and large ; the plant is good runner, strong and healthy ; the berry is roundish, large, bright color, firm ; the plant is quite productive ; this is a profitable variety to grow ; a good shipper ; would advise a trial.

Staples (Perfect).—This is a good early kind ; will fertilize the Warfield and is a good one to grow with that variety, as the berry is very similar both in shape, size and color.

Stahaline (Imperfect).—Plant very free grower, making many plants and healthy ; fruit is roundly conical, medium to large in size ; good quality ; fairly productive.

Sample (Imperfect).—Plant is healthy, makes a good row of plants ; the fruit is large and fine in appearance, though not of best quality and on the soft side. It bore a good crop and will do well for near market. I am on the whole pleased with this variety ; it does not come up to what was claimed for it ; it was said to be the most wonderful berry of the 19th century , it is not that, but it is a good one.

Tennessee Prolific (Perfect).—This variety has done well again this year ; plant is healthy, good grower, making wide row, very productive ; berry, medium to large bright red, firm and carries well ; a first-class market sort ; has done very well wherever grown.

Vera (Imperfect).—Strong grower, vigorous and healthy ; no rust ever seen on it ; quite productive ; berry good size, conical in shape, looks well in the box and ships well ; bright glossy, firm and good quality ; not very extensively grown.

Van Deman (Perfect).—This is an early variety ; plant sometimes has some rust ; the season of the Van Deman is long, it is among the first to ripen and you can pick it with the latest ; the berry is conical in shape, firm, the very first quality ; a good early.

Warfield (Imperfect).—Plant good grower, but small, healthy and very productive ; berry medium in size, conical, dark color, firm and good quality where it has enough moisture ; one of the most profitable kinds.

Wm. Belt. (Perfect)—This is a good one. Plant good grower but rusts somewhat, is quite productive, berry is large, conical, fine-looking, firm and good quality. It does not do equally well in all places : with me it has done very well and is well worth growing ; berries bring highest price.

Williams. (Perfect)—Widely grown in Canada ; a good one but not as good as Saunders ; plant good runner and lies close to the ground ; plants are produced close together ; quite productive ; berry roundly conical, does not ripen at tip ; sometimes green and seedy ; is firm and ships well ; fair quality.

Woolverton. (Perfect)—A good one for fancy berries ; a good strong plant ; healthy ; blooms among the first ; rich in pollen ; berry is very large, conical in shape, mild and good quality ; medium to late in season ; I like the Woolverton.

New Varieties.

I have secured some new varieties, some of which are very highly spoken of. They will fruit with me the coming season, when I will report on how they do here. Among them are the following :—August Luther (P.), claimed to be the earliest; Bennett (Imp.); Gibson (P.), Howell No. 2 ; Johnson's Early (P.) ; Mrs. McDowell ; Miller (P.) ; New York (P.) ; Parsons' Beauty (P.) ; Pennell (P.) ; Rough Rider (P.) ; Sunshine ; Salem (P.) ; Senator Dunlop (P.) ; W. J. Bryan (P.).

Early and Extra Early Varieties.

As the result of this season's fruiting the first to ripen were Van Deman, Mitchell's Early, Smith's, Excelsior, Clyde, Staples, Lord Sheffield, Warfield, Marshall.

Medium early to mid-season :—Bismarck, Bubach, Haverland, Seaford, Tennessee Prolific, Splendid, Ruby, Mastodon, Nick Ohmer, Wm. Belt, Glen Mary.

Later Kinds.

The best are Margaret, Brandywine, Gandy, Hunn, Saunders, Williams', Woolverton, Aroma, Klondike.

Growers cannot go astray in choosing from the above list. The above are among the best and most profitable that have been offered to the public. The past two or three years strawberry growing has paid well, crops have been good and prices have kept up, so that more money has been made out of strawberries than any other small fruit.

CATALOGUE OF FRUITS AND FRUIT TREES FOR THE USE OF PLANTERS.

Showing their adaptability to the various parts of the Province, designed to aid planters in selecting suitable varieties.

APPLES.

Key to Quality:
1 Very Poor.
2–3 Poor.
4—5 Fair
6 -7 Good.
8—9 Very Good.
10— First Class.

Key to Market Value.
1— 3 4th Rate.
4 6 3rd Rate.
7— 8 2nd Rate.
9—10 1st Rate.

Key to Adaptation:
*—Desirable.
**—Especially Desirable.
+—Promising.
0—Undesirable.
00—Not Hardy.

Key to Stations:
1. Southwestern.
3. Wentworth.
4. Burlington.
5. Lake Huron.
6. Georgian Bay.
7. Simcoe.
8. East Central.
9. Bay of Quinte.
10. St. Lawrence.
13. The Secretary's Fruit Farm.
14. Algoma.

Varieties tested at Bay of Quinte Station. W. H. Dempsey, Trenton.	Season in use.	Tree.				Fruit.					Adaptation.										
											Southern Stations.				Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale 1-10.	Total value of tree.	Quality, scale 1-10. Dessert.	Quality, scale 1-10. Cooking.	Value, scale 1-10. Home market.	Value, scale 1-10. Foreign market.	Total value of fruit	No. 1.	No. 13.	No. 3.	No. 4	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
APPLES.																					
Adams Pearmain	Jan.-Feb.	7	8	8	23	10	9	9	9	35	....	....	....	....	..	....	....	*	..	....	....
Albury	Aug.-Sept.	8	10	6	24	6	6	4	.....	16	....	....	....	....	....	....	....	*	0	....	....
Alexander	Aug.-Oct	10	10	8	28	4	9	9	9	31	0	*	*	*	*	*	*	*	**	*	....
American Golden Russet	Jan.-Mar.	8	10	6	24	8	8	7	9	32	*	*	*	*	*	*	**	0	*	*	...
American Pippin	Jan.-Mar.	8	9	6	23	7	8	7	8	30	....	....	....	....	....	....	*	*	..	..	..
Antonovka	Feb.-Mar.	8	8	8	24	7	7	4	4	22	....	....	....	....	....	....	....	0	....	....	....
Astracan	Aug.-Sept	9	10	8	27	8	8	7	1	24	*	**	....	*	*	**	*	0	0	*	....
Bailey Sweet	Nov.-Mar	6	8	8	22	4	8	4	4	20	....	....	....	....	0	*	....	0	....	....	....
Baldwin	Jan.-Mar	6	7	10	21	6	8	8	8	26	**	*	**	**	**	**	*	*	00	00	00
Beauty of Kent	Oct.-Nov	10	10	8	28	4	6	8	8	26	....	*	....	....	*	....	*	0	*	....	....
Ben Davis	Mar.-May	8	10	10	28	3	6	6	9	25	**	*	....	*	*	**	**	**	**	*	...
Benoni	July-Sept	8	10	8	26	10	8	4	7	29	....	....	....	....	....	*	....	0	....	....	....
Blenheim	Nov.-Mar	10	10	10	30	6	8	9	9	31	*	**	....	*	*	*	*	*	**	....	....
Blue Pearmain	Oct.-Feb.	8	10	6	24	8	7	8	9	32	....	0	....	....	....	....	*	....	*	*	....
Bogdanoff	Oct.-April	10	10	8	28	....	....	....	.....	....	....	....	....	....	....	....	....	....	....	....	....
Bonum	Dec.-Feb.	8	10	10	28	8	8	7	7	38	....	....	....	....	....	....	**	0	....	....	....
Boston Star	Oct.-Dec.	9	10	10	29	6	9	7	8	30	....	....	....	....	....	....	....	....	*	0	....
Bietigheimer	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	*	....	....	....
Bismarck	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	*	....
Brockville Beauty	Aug.-Sept.	7	8	10	25	9	9	7	.....	25	....	....	....	....	....	....	....	....	*	....	....
Cabashea	Oct.-Nov	10	10	5	25	2	6	6	6	20	*	0	....	*	*	*	0	0	0	.	...
Canada Reinette	.....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....

Canada Red	Dec.-Mar	8	9	10	27	7	8	8	.....	22	*	*	....	*	*	*	*	0	0	0	....
Cayuga Red Streak	Dec.-Feb	7	4	8	19	4	8	7	6	25	0	*	....	....	....	**	**	0	*	...	....
Cellini	Oct.-Nov	7	7	7	21	6	7	6	7	26	....	....	....	....	....	....	....	*	....	....	....
Chenango Strawberry	Sep.-Oct	6	7	7	20	9	7	7	.....	23	....	*	....	0	*	*	*	0	*	....	....
Colvert	Oct.-Nov	7	10	9	26	4	8	7	6	25	*	*	....	*	*	**	*	*	**	....	....
Cox's Orange Pippin	Dec.-Jan	4	7	7	18	10	9	9	9	37	...	....	....	....	....	....	....	**	..	....	....
Cranberry Pippin	Dec.-Feb	8	10	9	27	4	6	9	10	30	*	....	....	*	....	....	....	*	....	....	....
Early Harvest	July-Aug	7	8	8	23	8	7	6	.....	21	*	**	..	*	0	*	*	*	0	....	....
Early Joe	July-Aug	7	8	9	24	7	7	6	....	20	..	0	....	....	....	....	....	0	....	....	....
English Codling	Aug.-Sept.	7	8	8	23	7	8	6	....	21	....	....	....	....	....	....	....	0	....	....	....
Fallawater	Jan.-Mar.	10	10	5	25	5	8	8	9	31	*	....	....	....	....	....	....	0	....	....	....
Fall Jenneting	Sept.-Oct.	9	9	9	27	5	6	4	4	19	*	*	....	0	*	*	....	0	*	....	....
Fall Pippin	Oct.-Dec	10	10	8	28	7	10	6	6	28	*	....	....	....	....	....	....	0	....	**	....
Fameuse	Sept.-Dec.	8	8	10	27	10	8	10	8	36	*	0	....	0	0	*	*	0	*	....	....
Gideon	Oct.-Dec	10	10	10	30	8	9	10	8	35	...	0	...	0	*	**	**	*	**	....	**
Golden Sweet	Aug.-Sept	10	10	10	30	2	4	1	.....	7	....	....	....	*	....	....	....	....	*	....	....
Golden White	Aug.-Sept	10	10	10	30	6	8	8	.....	22	....	0	....	....	....	....	0	0	....	....	....
Grand Sultan	Aug.-Sept	10	10	8	28	5	8	6	6	25	....	....	....	....	....	*	....	0	....	....	....
Gravenstein	Aug.-Sept	10	10	10	30	10	10	10	10	40	....	....	....	*	0	**	*	*	*	....	....
Green Newtown Pippin		....	....	....	....	....	....	....	....	....	....	**	....	....	....	....	....	**	....	....	....
Grimes Golden	Oct.-Mar	7	5	8	20	9	6	4	.. ..	....	....	....	....	....	....	....	....	00	....	....	....
Greening	Jan.-Mar	8	8	10	26	8	10	8	8	34	**	**	**	0	*	*	*	0	00	....	....
Haas	Sept.-Oct	9	9	9	27	2	6	6	4	21	**	**	**	**	**	**	**	**	**	....	....
Hare Pipka	Sept.-Oct	10	10	9	29	5	8	9	7	28	....	....	....	0	0	*	**	0	*	*	....
Hastings	Jan.-Feb	8	9	8	25	8	7	7	6	28	....	....	....	....	....	....	....	....	*	....	....
Hawthornden New	Oct.-Dec	8	8	8	24	7	7	8	8	30	....	....	....	....	....	....	....	*	....	....	....
Hawthornden Old	Sept.-Nov	7	8	8	23	5	7	5	7	24	....	....	....	....	....	....	....	*	....	....	....
Highland Beauty	Jan.-Mar	6	9	8	22	9	7	7	7	30	....	....	....	0	....	0	....	*	....	....	....
Holland Pippen	Aug.-Oct	8	8	7	23	6	7	6	5	24	....	....	....	....	....	....	....	0	....	....	....
Horn	Dec.-Mar	8	10	10	28	8	7	7	7	29	....	..	....	*	....	0	*	0	....	....	....
Hubbardston's Nonsuch	Dec.-Mar	8	10	9	27	6	7	8	8	29	....	....	....	....	....	..	....	**	....	....	....
Hurlbut	Dec.-Feb	7	9	7	23	8	8	8	8	32	....	....	....	....	....	..	0	**	....	....	....
Jonathan	Dec.-Mar	8	8	9	25	10	7	8	9	34	.	....	....	....	....	....	....	**	**	....	....
Kean's Seedling	Sept.-Nov	10	10	10	30	7	10	9	7	33	..	+	....	....	....	*	....	*	....	....	....
Kentish Fillbasket	Oct.-Jan	9	9	9	26	4	9	7	....	20	....	....	....	....	....	....	....	....	*	....	....
King	Oct.-Feb	7	5	5	17	9	10	10	10	39	**	*	*	0	*	*	*	0	*	....	....
La Rue	Oct.-Dec	10	8	6	24	7	7	6	..	20	....	....	....	*	**	**	*	0	00	00	00
Lord Burleigh	Jan.-May	10	9	9	28	8	10	8	8	34	....	....	....	....	....	....	....	0	*	*	*
Lord Suffield	Aug.-Sept	6	8	9	23	4	7	5	3	21	....	....	....	....	....	....	....	0	....	....	....
Lowell	Sept	6	8	9	23	4	7	5	5	21	....	....	....	....	....	....	....	0	....	....	....
McIntosh Red	Nov.-Mar	9	10	10	29	10	8	8	7	32	....	....	....	....	*	....	....	....	*	....	....
Mann	Feb.-May	7	10	5	22	6	8	6	7	27	*	+	....	....	....	*	0	*	*	....	....
Maiden's Blush	Oct.-Dec	9	10	10	29	5	8	9	8	30	*	....	....	0	**	*	*	*	*	**	....
Margil	Nov.-Jan	6	7	9	22	10	8	7	7	32	*	0	....	*	**	*	....	*	....	*	....
Minkler	Jan.-April	9	10	8	27	6	7	8	8	29	....	....	....	....	....	....	....	*	....	....	....
Mother	Nov.-Jan	5	7	7	19	10	8	7	7	32	...	....	....	....	....	....	**	*	....	....	....
Mountain Beet	Sept.-Oct	8	9	8	25	6	6	5	.....	17	....	....	....	....	*	....	....	0	....	....	....
Mountain Tulip	Sept.-Oct	7	8	8	23	6	6	6	....	18	...	....	....	....	....	....	....	0	....	....	....
Munson Sweet	Oct.-Dec	10	10	10	30	1	3	2	.....	6	...	....	....	....	0	....	....	0	....	....	....
Northern Spy	Jan.-Mar	10	8	10	28	9	9	9	9	36	**	**	**	**	**	**	...	*	**	0	00
Northfield Beauty	Sept	8	9	9	26	9	8	9	.....	26	...	....	....	....	....	....	....	*	....	....	....

CATALOGUE OF FRUITS —APPLES.—*Continued.*

Varieties tested at Bay of Quinte Station. W. H. Dempsey, Trenton.	Season in use.	Tree.				Fruit.					Adaptation.										
											Southern Stations.				Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale, 1-10.	Total value of tree.	Quality, scale 1-10. Dessert.	Quality, scale 1-10. Cooking.	Value, scale 1-10. Home market.	Value, scale 1-10. Foreign market.	Total value of fruit	No. 1.	No. 13.	No. 3.	No. 4.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
APPLES.—*Con.*																					
Oldenburg	Aug.-Sept	10	10	10	30	6	9	10	9	34	**	*	*	*	**	**	*	**	**	**	**
Ontario	Jan.-Mar	8	9	10	27	9	9	9	9	36	...	*	*	**	*	**	*	**	**	+	....
Pewaukee	Jan.-Mar	10	10	8	28	7	8	8	8	31	*	*	....	....	**	0	*	0	0	*	...
Princess Louise	Dec.-Feb	6	7	9	22	8	6	8	9	31	....	*	....	....	....	....	*	0	*	....	....
Plumb Cider	Oct.-Dec	8	9	10	27	4	4	4	.....	12	....	....	....	*	....	....	....	0	....	....	....
Rambo	Oct.-Jan	9	10	10	29	5	5	5		15	....	0	....	*	0	0	....	0	....	....	....
Rawle's Janet	Feb.-June	6	9	10	25	5	4	5	5	19	....	....	....	....	....	....	....	0	**	*	....
Ribston	Nov.-Mar	7	7	6	20	10	8	9	10	37	*	*	*	**	0	*	*	0	....	....	....
Peter																					
Roxbury	Jan.-May	7	7	8	22	6	7	8	8	29	*	*	*	**	*	*	....	*	*	....	....
Salome	Jan.-May	8	9	7	24	9	6	8	10	33	....	....	....	....	....	....	....	....	....	*	....
Sutton Beauty															*	....	....	....	....	....	....
Stump	Sept.-Oct	8	8	8	24	6	6	6	5	23	....	..	....	....	....	....	....	0	....	....	....
Scarlet Pippin	Sept.-Dec	9	10	10	29	10	9	10		29	....	....	....	....	....	....	....	....	....	**	....
Seek No Farther	Dec.-Mar	8	8	8	24	7	7	8	8	30	....	*	....	*	0	..	0	*	*	*	....
Sops of Wine	Aug-Sept.	8	9	7	24	4	4	4	.....	12	....	....	....	....	0	0	....	0	....	....	....
Sour Bough	Aug.-Sept	10	9	8	27	2	7	8	....	17	....	....	....	....	0	....	....	....	....	....	....
St. Lawrence	Sept.-Oct	9	10	10	30	8	9	9	6	32	*	....	....	*	*	**	..	0	*	*	....
Stuarts Golden	Dec.-Mar	8	9	10	27	7	6	6	6	25	....	....	....	....	....	....	....	*	....	....	....
Stark	Feb.-May	10	10	10	30	4	7	7	8	24	*	....	....	....	....	....	....	**	**	....	....
Spitzenburg		6	8	6	20	10	9	8	....	....	*	0	....	*	*	*	....	0	....	....	....
Swaar	Dec.-Mar	8	8	7	23	8	7	8	9	32	0	0	....	....	....	....	*	0	....	....	....
Swazie	Nov.-Jan	7	8	9	24	9	8	5	.....	22	*	*	....	*	*	*	*	0	*	....	....
Sweet Bough	Aug.-Sept	7	9	8	24	8	.....	5	....	13	....	*	....	*	*	....	....	....	*	....	....
Tolman Sweet	Dec.-April	10	10	9	29	6	6	4	4	20	**	*	....	*	*	*	*	*	*	*	....
Tetofsky	August	9	10	5	24	7	9	6	....	22	..	....	....	....	0	0	....	....	0	....	....
Utters Red															*	....	....	....	....	....	....
Wealthy	Sept.-Dec	9	9	10	28	9	8	9	8	33	*	*	....	*	*	*	**	**	*	**	+
Wagener	Dec.-Feb	7	8	10	25	9	8	9	7	32	*	*	....	*	**	*	....	*	*	....	....
Winesap	Dec.-May	6	8	9	23	7	5	7	7	36	..	....	....	....	....	....	....	....	....	....	....
Wolf River											....	....	....	....	....	....	....	....	*	*	+
Walbridge											....	....	....	....	....	0	0	0	0	....	....
Yellow Transparent	August	10	10	8	28	6	8	6	.....	20	*	*	....	....	*	*	*	*	*	*	**
Yellow Newton											....	....	....	....	....	....	....	*	00	....	....
Yellow Bellefleur	Dec.-Mar	6	8	5	19	9	8	7	...	24	....	0	....	*	*	0	....	0	*	*	.

CATALOGUE OF FRUITS—BLACKBERRIES—RASPBERRIES.

Tested at Burlington Station.	Season in use.	Bush.				Fruit.					Adaptation.											
						Quality, scale 1-10.		Value, scale 1-10.			Southern Stations.					Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale, 1-10	Total value of Tree.	Dessert.	Cooking.	Home market.	Foreign market.	Total value of fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
BLACKBERRIES.																						
Agawam	July 27-Aug. 10	9	10	8	27	6		6		12	*			*	*	*						
Ancient Briton	" 21- " 5	7	9	7	23									0								
Childs' Tree	" 20- " 6	7	9	7	23									0								
Dorchester	" 23- " 5	9	9	7	25	7		7		14				0								
Early Cluster	" 25- " 10	9	10	7	26	7		7		14	0			0								
Early Harvest	" 13- " 1	7	7	9	23	6		8		14	0			*	*							
Early King	" 12- " 1	7	9	8	24	8		8		16				+								
Eldorado	" 23- " 5	8	8	7	23	9		8		17	*			0								
Erie	" 23- " 5	9	10	7	26	7		8		15	0			*	*							
Gainor	" 23- " 5	9	10	9	28	10		9		19	*			+								
Kittatinny	" 23- " 15	10	9	10	29	10		10		20	**			*	*							
Lovett's Best	" 30- " 10	8	10	8	26	6		5		11				0								
Maxwell	" 20- " 1	5	7	5		5		8		13				0								
Minnewaski	" 25- " 5	8	8	6	22						*			0								
Ohmer	" 23- " 5	9	10	7	26	8		8		16				+								
Snyder	" 18- " 1	7	10	8	25	8		8		16	*			*	*							
Stone's Hardy	" 23- " 5	7	10	8	25	8		8		16	0			+	*							
Taylor	" 23- " 5	9	10	7	26	9		7		16	*			*	*							
Wachusetts	" 23- " 10	9	10	6	25	10		7		17	0			0								
Western Triumph	" 23- " 5	10	10	8	28	8		9		17	0			*								
Wilson's Early	" 20- " 5	7	9	7	23	8		9		17				0								
Wilson, Jun	" 20- " 5	10	8	6	24									0								
RASPBERRIES.																						
All Summer	July 8-Oct. 15	6	9	7	22	8		8		16				*		0						
Columbia	" 13- " 28	9	10	9	28	7		8		15				*		0						
Cuthbert	" 13- " 31	10	10	8	28	10		10		20	**			**	**	**						
Golden Queen	" 5- " 20	8	10	7	25	9		6		15	*			*	*	0						
Gregg	" 13- " 31	9	10	7	26	7		7		14	*			*	*	*						
Hilborn	" 5- " 20	8	9	7	24	6		7		13	**			*	*	**						
Japan Wine	" 25- " 31	8	6	4	18	5		5		10				00		0						
Kansas	" 5- " 20	9	10	9	28	10		8		18	**			**		*						
Kenyon	" 12 " 25	7	8	7	22																	

Tested at Burlington Station.	Season in use.	Tree or bush.				Fruit.					Adaptation.											
						Quality, scale 1-10.		Value scale 1-10.			Southern Stations.					Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale 1-10.	Total value of Tree.	Dessert.	Cooking.	Home market.	Foreign market.	Total value of fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
RASPBERRIES.—*Con.*																						
Lottie	July 10-Oct. 25	8	8	7	23	....	....	....	....	....	....	....	....	....	....	0	....	....	....	....	....	....
Loudon	" 13- " 31	8	10	8	26	8	....	8	....	17	*	....	....	*	....	*	....	....	....	....	....	....
Lovett	" 10- " 25	7	9	7	23	6	....	8	....	14	....	....	....	0	....	0	....	....	....	....	....	....
Marlboro	" 5- " 25	7	10	10	27	2	....	10	....	17	0	..	....	**	**	*	....	....	....	....	....	....
Miller	" 12- " 23	6	9	7	22	....	....	....	....	....	....	....	....	*	....	*	....	....	....	....	....	....
Mills	" 9- " 20	8	9	7	24	....	....	....	....	....	....	....	....	....	....	....	..	....	....	....	....	....
Ohio	" 3- " 31	9	10	8	27	9	....	8	....	17	....	....	....	*	....	*	....	....	....	....	....	....
Older	" 8- " 25	8	9	6	23	4	....	8	....	12	....	....	....	*	....	*	....	....	....	....	*	....
Palmer	" 1- " 20	8	10	8	26	9	....	8	....	17	*	....	....	*	....	....	....	....	....	....	....	....
Phœnix	" 11- " 25	5	9	7	21	....	....	....	....	....	*	....	....	....	....	*	....	....	....	....	..	....
Progress	" 3- " 20	8	10	5	23	8	....	8	....	15	....	....	....	....	....	0	....	....	....	....	....	....
Redfield	" 10- " 20	8	10	7	25	0	....	8	....	17	....	....	....	†	....	0	....	....	....	....	....	....
Reliance	" 3- " 31	8	10	8	26	9	....	9	....	18	....	....	....	†	....	0	....	....	....	....	....	....
Royal Church	" 13- " 31	6	9	7	22	....	....	....	....	....	0	..	....	....	....	0	....	....	....	....	....	....
Shaffer's Colossal	" 10- " 25	9	8	7	24	5	....	8	..	13	*	..	....	*	*	*	....	....	....	....	....	....
Smith's Giant	" 13- " 31	10	8	9	27	8	....	8	....	16	....	....	....	†	†	*	....	....	....	....	....	....
Souhegan	" 8- " 20	7	10	7	24	7	....	8	....	15	....	....	....	*	....	*	....	....	....	....	....	....
Thompson	" 8- " 31	6	10	6	22	5	....	7	....	12	....	....	....	....	....	....	....	....	....	....	....	....
Winant	" 10- " 25	5	7	3	15	....	....	....	....	....	....	..	....	0	....	....	....	....	....	....	....	....
CHERRIES. Tested at Maplehurst.																						
Choisy	June 24-July 4	6	9	4	19	10	4	5	4	23	....	..	....	....	*	....	....	....	....	....	....	....
Cleveland	" 15 to 25	9	8	8	25	10	5	9	8	32	....	....	....	....	**	....	....	....	....	....	....	....
Coe	" 25-July 6	10	8	6	24	6	5	5	2	19	*	....	....	....	0	....	....	....	....	....	....	....
Dyehouse	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	....	....
Eagle	July 1 to 10	7	8	4	29	10	4	4	8	7	....	....	....	....	0	....	....	....	....	**	....	....
Early Purple	June 15 to 25	9	9	5	23	8	2	8	8	26	....	....	....	....	*	....	....	....	....	....	....	....
Elkhorn	July 10 to 20	8	8	10	26	5	6	10	10	21	....	....	....	....	**	....	....	*	....	....	....	....
Elton	....	7	8	8	9	9	8	8	....	....	*	....	....	....	*	....	....	....	....	....	....	....
English Morello	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	*	....	....	*	....	....
Eugenie	June 20 to	9	10	7	26	0	10	6	6	28	....	....	....	....	*	....	....	**	....	....	....	....
Hortense	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	....
Kentish (late)	....	4	10	4	18	2	7	6	6	21	**	....	....	....	*	*	*	....	....	*	*	....
Knight	June 20 to 30	7	8	6	21	10	5	9	9	33	..	**	....	....	*	....	....	....	....	....	....	....

Kosloy Morello	July 10 to														†								
Late Duke																*							
Magnifique																							
May Duke	July 15 to 30	8	9	7	24	7	10	9	8	34	*	**			**	*	*	*					
Mazzard	July 1 to 12	10	10	4	24		2	2		4	0				6								
Mezel	July 4 to 14	10	8	10	28	8	7	10	10	35					**								
Montmorency	July 1 to 10	6	10	8	24	3	9	7	7	26	**	**	**	*	**	*	**	**			*		
M. Ordinaire																**	**						
Napoleon	July 4 to 12	9	8	10	27	5	8	9	9	31	*	*			**								
Olivet		8	10	7	25	4	10	7	7	28	*				**	*							
Orel 24																					*		
Ostheim	July 8 to 16	4	10	7	21	4	8	7	7	26					*	*					**	*	†
Philippe		8	8	8		6	9				*												
Richmond	June 20 to 30	4	10	6	20	3	9	7	7	26	**				**	**	*				*	*	†
Rockport																							
Spanish	July 4 to 12	10	8	6	24	8	8	8	8	32	*	*			0								
Tartarian		8	8	7	23	10	7	10	10	37	*	**			**		*	**					
Vladimir												*									0		
Windsor		8	10	8	26	8	5	10	10	33	**				**	*				**	0	*	
Wood	June 20 to July 4	7	8	8	23	10	5	8	7	30	*				**		*						
Wragg															*	*							
CURRANTS. Tested at Burlington.																							
Belle de St. Giles	July 8–13	7		5	12	9		10						*									
Black Victoria	" 8–20	9		6	15			9						*									
Brayley's Seedling	" 8–13	7		8	15	6		8		14				†									
Champion	" 20–31	10		9	19			10			*			*		*							
Cherry	" 6–12	8		9	17	9		10		19	*			**	**	*							
Collin's Prolific	" 20–31	10		5	15			9						0									
Fay's Prolific	" 7–12	6		7	13	7		9		16	*			*	**	*							
Lee's Prolific	" 12–20	8		8	16			9			*			**	**	*							
Naples	" 12–20	9		9	18			9			*			**	*								
New Victoria	" 4–8	7		6	13									0									
North Star	" 7–12	7		7	14	7		9		16				0	00								
Pomona	" 4–8	7		5	12																		
Raby Castle	" 11–16	8		10	18	7		8		15	*			*	*								
Red Cross	" 7–12	7		7	14	8		6		14	*			*									
Red Dutch	" 4–8	8		7	15	7		7		14				*									
Red Victoria	" 7–12	8		9	17	9		9		18	*			*									
Saunders	" 12–20	9		6	15									*	**								
Versailles	" 7–12	7		6	13	7		8		15	*			*	*								
White Grape	" 7–12	8		8	16	7		7		14	*			†	0	*							
White Imperial	" 7–12	8		7	15	10		8		18				†									
Wilder	" 7–12	8		8	16	7		10		17	*			*									

All hardy thus far.

(a) Those varieties left blank not as yet sufficiently tested.

CATALOGUE OF FRUITS—GRAPES.

Key to Quality:
1 Very Poor.
2—3 Poor.
4—5 Fair.
6—7 Good.
8—9 Very Good.
10 First Class.

Key to Market Value:
1—3 4th Rate.
4—6 3rd Rate.
7—8 2nd Rate.
9—10 1st Rate.

Key to adaption:
*—Desirable.
**—Especially Desirable.
†—Promising.
0—Undesirable.
00—Not Hardy.

Tested at Wentworth Experimental Station by M. Pettit, Winona.	Season in use.	Tree.					Fruit.			Adaptation.										
										Southern Stations.					Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, Scale 1-10.	Freedom from disease, scale 1-10.	Total value of Vine, max. 40.	Quality, scale 1-10. Dessert.	Value, scale 1-10. Home Market.	Total value of Fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	
Adirondac	September	3	2	2	2	9	9	2	11	...	...	0	...	...	...	..	...	....	...	...	...
Agawam (Rog. 15)	Oct. Nov	9	9	8	4	30	9	9	18	**	**	**	*	**	...	...	**	....	...	...	...
Alvey (Hagar)	October	7	8	6	8	29	2	2	4	...	...	*	...	...	...	...	...	....	...	...	...
Amber	"	6	6	3	4	19	2	2	4	...	...	0	...	...	...	...	...	....	...	...	...
Amber Queen	Oct.-Nov	7	6	5	6	24	6	5	11	...	...	0	...	...	...	...	0	....	...	...	...
Aminia	September	6	8	7	7	28	6	...	...	...	..	*	...	...	...	...	...	....	...	...	...
America	October	8	9	6	7	30	2	...	...	...	...	0	...	...	...	...	*	....	...	...	...
August Giant	September	8	8	7	8	31	5	5	10	...	...	0	...	0	...	...	...	....	...	...	...
Bacchus	October	9	9	8	8	34	2	...	...	...	...	0	...	0	...	...	...	....	...	...	...
Barry	"	9	9	8	7	33	7	7	14	*	...	*	*	...	...	...	...	....	...	...	...
Beckman's	September	6	6	5	7	24	7	...	...	...	...	*	...	...	...	...	...	....	...	...	...
Black Delaware	"	4	7	4	7	22	8	...	...	...	...	0	...	...	...	...	...	....	..	...	...
Black Eagle	"	7	5	6	6	24	8	...	...	...	...	0	...	...	...	...	...	....	...	...	...
Black Pearl	"	9	9	9	9	36	2	2	4	...	...	0	...	...	...	...	...	....	...	...	...
Brighton	"	8	10	7	6	31	8	7	15	*	*	*	0	**	*	**	*	....	...	..	...
Brilliant	"	8	8	7	7	30	7	...	...	...	...	*	...	...	...	...	...	....	...	...	...
Cambridge	October	8	8	8	6	30	8	...	...	...	...	*	...	...	...	...	...	....	...	...	...
Catawba	Oct. Nov	8	10	8	5	31	10	...	..	*	*	*	0	*	...	...	...	....	...	...	...
Colerain	September	7	7	8	8	30	8	10	20	...	...	...	...	...	...	...	...	....	...	...	...
Concord	Sept.-Oct	10	10	10	9	39	6	10	16	**	*	**	**	**	**	*	*	....	...	*	..
Cottage	September	6	8	3	8	25	4	4	8	...	...	0	...	...	...	...	...	....	...	...	...
Clinton	...	...	...	...	...	...	...	...	...	0	*	....	0	0	**	0	*	....	....	....	..
Crevelling	September	10	10	6	6	32	6	4	10	...	..	...	...	*	...	...	...	....	...	...	...
Croton	"	6	7	6	6	25	8	...	...	...	....	0	..	...	...	...	...	....	...	...	...
Cynthiana	October	7	8	5	6	26	2	...	...	...	....	0	...	...	...	...	...	....	...	...	...

Delaware	September	5	8	8	6	27	10	10	20	**	*	**	**	**	*	*	**			*		
Diana	October	9	9	7	6	31	6	6	12	0		*		*								
Dracut Amber	September	6	9	7	6	28	2	4	6			0										
Dr. Collier	October		8	8	7	30	4					*										
Duchess	"	6	5	6	8	25	5	6	11			0		*				0				
Early Ohio	August	7	8	8	8	31	5					*						**				
Eldorado	September	8	8	6	7	29	9	6	15			0	0									
Empire State	"	7	8	4	7	26	4	4	8	0	0	0		*				†				
Eumelan	"	6	7	6	7	26	7	5	12	0		0										
Goethe (Rog. 1)	October	9	9	8	8	34	4	7	11					0								
Herbert										*	**	*						0				
Jefferson	Oct.-Nov.	4	5	5	7	21	6	6	12			0										
Janesville												0		*				**				
Jessica												0	0	*						*		
Lady	September	2	10	2	6	20	8	8	16				*	**				0				
Lady Washington	October	9	9	7	5	30	4	4	8		0	0		0								
Lindley (Rog. 9)	September	9	10	8	8	35	9	9	18	**	**	**	*	**	*			**				
Lutie	"	7	8	9	8	32	4															
Marion	October	8	8	7	8	31	2					0										
Martha	September	4	6	4	6	20	7	4	11	0		0						0				
Massassit (Rog. 3)	"	10	9	6	6	31	8	7	15	*	0	*	*	*		*						
Mills	"	6	8	7	7	28	8					*		†								
Merrimae										*	*	*		*								
Missouri Reisling	October	7	8	7	5	29	4	3	7			0		0								
Moore's Diamond	September	6	8	6	7	27	7	7	14	**		*	*	*		**	**		*			
Moore's Early	"	5	9	4	9	27	7	8	15	**	*	*	*	**	**	*	*		*	*		
Moyer										0		*	*	0			*		*			
Niagara										**	**	**	*	**		**	**		*	*		
Noah	October	9	9	10	5	33	2	3	5			0		0								
Oneida	"	8	7	8	7	30	5					0										
Perkins	September	8	8	7	7	30	3	5	8					*								
Pocklington	October	5	8	6	8	27	7	6	13	0	0		*	*		*		*				
Poughkeepsie Red	"	7	6	5	6	24	8			*		*		†								
Prentiss	"	6	7	6	6	25	5	5	10			0										
Rebecca	September	3	4	3	3	13	8	5	13													
Requa (Rog. 28)	"	10	8	8	7	33	8	8	16			*										
Rockwood	October	7	8	9	6	30	8					*										
Salem	September	10	8	8	6	32	8	9	17	*	*	*	*	**		*	0			**		
Taylor	October	9	9	3	7	28	2	2	4			0										
Triumph	"	9	9	9	8	35	6					0		0								
Transparent	"	7	7	7	6	27	6							0								
Ulster Prolific	"	7	8	8	7	30	5			†				†								
Vergennes	Oct.-Nov.	7	7	6	7	27	6	8	14		**	*	*	**		*	0					
Victoria	September	7	6	6	7	26	6							*								
Wilder	"	7	9	7	7	30	7	8	15	**	*	**	*	**		*						
Woodruff Red		9	9	8	8	34	8			*		*		†								
Worden	September	7	10	7	8	32	9	8	17	**	**	**	**	**	**	*			*			
Wyoming Red	"	8	8	7	8	31	4	6	10	*	*		*	†								

CATALOGUE OF FRUITS—PEARS.

Tested by E. C. Beman, Newcastle, Ont.	Season in use.	Tree.				Fruit.				Remarks.
		Vigor.	Hardiness.	Productiveness.	Total value of tree	Quality.		Home market value.	Total value of fruit.	
						Dessert.	Cooking.			
Ananas d'Ete	Sept, Oct.	7	6	7	20	8	6	8	22	Very subject to blight.
**Bartlett	Sept.	8	8	9	25	9	10	10	29	One of the best for market.
Bergamot Gansels	Sept, Oct.	6	9	5	20	8	5	5	18	
Bergamot Gansels, late	Jan., Mar.	6	8	8	22	2	5	4	11	Not worth growing.
Belle Lucrative	Sept, Oct.	7	6	7	20	8	6	6	20	Very good, subject to blight.
Beurre Assomption	Sept.	7	5	6	18	6	7	8	21	Not sufficiently hardy
*Beurre Bosc	Oct., Nov.	8	7	8	23	9	7	10	26	Very fine for market.
Beurre Bachelier	Oct., Nov.	7	8	8	23	5	5	6	16	Not valuable.
Beurre Baltet Pere	Nov., Dec.	6	6	8	20	5	6	6	17	
**Beurre Clairgeau	Nov., Dec.	6	5	8	19	5	6	8	19	Very showy.
Beurre d'Amanlis	Sept	8	9	9	26	5	5	4	14	
*Beurre d'Anjou	Nov., Dec.	9	10	4	23	9	6	10	25	Not productive.
Beurre d'Aremburg	Dec., Jan.	8	8	7	23	6	6	5	17	Sometimes astringent.
Beurre de Martillet	Sept.	7	6	7	20	7	5	7	19	Rots at core, handsome,
Beurre Diel	Nov., Dec.	7	8	6	21	8	7	7	22	Liable to rot.
Beurre Gris	Sept, Oct.	6	7	6	19	6	6	5	17	Very valuable, usually poor.
Beurre, Golden of Bilboa	Sept	7	5	6	18	5	6	6	17	Very showy, but poor.
Beurre Goubalt	Sept.	5	5	7	17	4	5	3	12	Not worth growing.
Beurre Hardy	Oct	8	8	6	22	7	6	7	20	
Beurre Oswego	Oct., Nov.	8	9	8	25	6	5	5	16	Spots and cracks.
Beurre Robin	Sept.	9	8	8	25	5	5	6	16	
Beurre Superfin	Oct	8	10	6	24	8	6	6	20	
Blanc Perne	Dec., Ap'l	6	7	8	21	2	6	4	12	Not worth growing.
Black Warseter	Dec., Mar.	9	8	10	27	1	4	2	7	Of no value.
Bloodgood	Aug.	5	7	7	19	9	5	5	19	Fine for home use.
Bonne d'Eyee	Sept, Oct.	5	6	6	17	8	6	5	19	Identical with Buckworth.
Bon Chretien, Summer	Sept.	7	9	7	23	5	8	5	18	Spots and cracks.
Brandywine	Sept.	8	8	5	21	7	4	5	16	Rots at core.
British Queen	Nov.	7	6	5	18	7	6	6	19	
Buffum	Sept, Oct.	8	7	8	23	6	5	5	16	
Catillac	Dec., Apr.	6	5	7	18	1	6	3	10	
Calite Mignot	Nov., Dec.	7	6	10	23	2	4	3	9	
Church	Sept, Oct.	7	8	6	21	7	5	6	18	
*Clapp's Favorite	Sept.	9	7	9	25	9	8	9	26	Subject to blight.
Comet	Aug.	8	7	8	23	2	4	5	11	Beautiful but very poor.
Dana's Hovey	Nov, Dec.	8	8	6	22	9	4	5	18	Very fine for home use.
Dearborn's Seedling	Aug.	7	8	7	22	8	6	5	19	
Dix	Oct., Nov.	8	8	6	22	7	6	6	19	Liable to spot and crack.
Doyenne Boussock	Sept, Oct.	9	8	7	24	7	6	9	22	
Doyenne d'Ete	July, Aug.	7	7	8	22	7	4	4	15	
Doyenne Gombalt	Dec., Mar.	5	5	4	14	6	5	6	17	
Doyenne Gris	Oct., Nov.	6	7	7	20	6	6	4	18	Spots and cracks.
Doyenne White	Oct.	7	8	8	23	8	6	5	19	Spots and cracks.
*Duchess d'Angouleme	Oct., Nov.	5	5	8	18	4	6	6	16	Season too short.
Duchesse de Bordeaux	Jan., Mar.	7	7	6	20	7	6	5	18	Good for home use.
Duchess Precoce	Sept.	7	8	10	25	6	10	10	26	Fine for market.
Flemish Beauty	Oct.	10	8	9	27	8	7	8	23	Spots and cracks.
Foselle	Nov., Dec.	6	5	6	17	4	4	5	13	Beautiful but poor.
Fondante de Malines	Sept, Oct.	5	6	8	19	3	6	7	21	
Garber	Nov.	10	7	10	27	4	8	7	19	
Glout Morceau	Dec.	5	4	6	15	5	6	4	15	Subject to blight.
Goodale	Oct.	8	9	9	26	7	7	8	22	
Graslin	Oct., Nov.	8	6	8	22	6	6	7	19	
Harvard	Sept.	8	9	7	24	5	5	6	16	Rots at core.
Howell	Oct.	7	7	9	23	6	7	8	21	
Idaho	Oct.	8	7	8	23	7	8	5	20	Very subject to blight.
Jaminette	Dec., Mar.	9	7	8	24	7	6	7	20	Good for long keeper.
Jargonelle, English	Aug.	7	6	7	20	6	5	3	14	Subject to blight and
Jones	Oct., Nov.	8	8	10	26	8	5	7	20	rots at core.
Josephine de Malines	Dec., Feb.	7	7	8	22	9	6	7	22	

PEARS.—*Continued.*

Tested by E. E. Beman, Newcastle, Ont.	Season in use.	Tree.				Fruit.				Remarks.
		Vigor.	Hardiness.	Productiveness.	Total value of tree.	Quality.		Home market value.	Total value of fruit.	
						Dessert.	Cooking.			
*Keiffer	Nov., Dec.	7	7	10	23	5	10	6	21	Rots at core.
Kirtland	Sept.	8	6	7	22	7	6	5	18	Unproductive.
King Sessing	Sept.	7	8	5	20	7	7	6	20	
*Lawrence	Nov., Jan.	7	7	8	22	9	7	7	23	
*Louise Bonne de Jersey	Sept., Oct.	7	7	9	23	7	9	7	23	Subject to blight.
Madeline	Aug	7	6	7	20	6	4	5	15	
Marshall	Sept	7	8	7	22	6	5	6	17	
Madame Eliza	Nov.	9	8	8	25	5	6	5	16	Subject to blight.
Mons. Haberlin	Sept.	7	6	5	18	7	6	6	19	
Mount Vernon	Nov., Dec.	8	8	7	23	8	6	7	21	
Nonreau Poiteau	Nov.	7	6	8	21	6	7	7	20	Sometimes astringent.
Onondaga	Oct., Nov.	8	6	7	21	6	6	7	19	
Osband's Summer	Aug.	6	7	6	19	7	5	4	16	
Ott	Aug.	7	6	8	21	9	5	5	19	Variable in flavor.
Passe Colmar	Dec., Jan.	8	6	8	22	7	6	5	18	
Paradise d' Automne	Sept., Oct.	8	7	9	24	8	6	7	21	Subject to blight.
Pitmaston	Oct., Nov.	7	6	8	21	6	8	8	22	
Pound	Dec., Mar.	7	7	6	20	1	6	4	11	
Pratt	Sept., Oct.	8	7	9	24	6	6	7	19	Very fine for home use.
Rostiezer	Aug., Sep.	8	7	6	21	9	5	6	20	
Rutter	Oct,. Nov.	7	7	8	22	6	5	7	18	Best dessert pear grown.
*Seckel	Sept., Oct.	7	9	8	24	10	6	7	23	
*Sheldon	Oct	9	8	7	24	9	7	9	25	Subject to blight.
Souvenir du Congres	Sept.	7	6	7	20	7	8	8	23	Subject to blight.
Steven's Genessee	Sept.	7	7	8	22	6	5	6	17	
St. Germain	Nov., Dec.	6	7	7	20	6	7	5	18	
St. Ghislain	Sept., Oct.	7	7	8	22	7	5	5	17	
Triomphe de Vienne	Sept.	8	8	9	25	8	7	8	23	
Tyson	Sept.	10	9	7	26	10	5	5	20	Variable in quality.
Urbaniste	Sept., Oct.	7	7	6	20	8	7	8	26	
Vicar of Wakefield	Nov., Feb.	8	6	8	22	2	8	6	16	
Washington	Sept.	7	7	9	23	8	5	6	19	
*Winter Nelis	Dec., Jan.	6	7	8	21	9	5	9	23	Variable in flavor, sometimes astringent.
Wilmot	Sept., Oct.	10	10	10	30	8	6	8	22	

CATALOGUE OF FRUITS.—PEARS.

Key to Quality.

1—Very Poor.
2-3—Poor.
3-4—Poor to Good.
5-6—Good to Very Good.
7-8—Very Good.
8-9—Very Good to Best.
10—Best.

Key to Adaptation.

*—Desirable.
**—Especially Desirable.
†—Promising.
0—Undesirable.
00—Not Hardy.

Varieties tested at East Central Station. R. L. Huggard, Whitby.	Season in use.	Tree.				Fruit.				Adaptation.											
										Southern Stations.					Middle Stations.				Northern Stations.		
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale 1-10.	Total value of tree.	Quality, scale 1-10. Dessert.	Quality, scale 1-10. Cooking.	Value, scale 1-10. Home market.	Total value of fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.
Ananas d'Ete	September, October	8	6	4	48	4	4	5	13	....	....	....	....	....	....	....	....	0	....	....	....
Bartlett	September	7	7	9	23	9	5	10	24	**	**	**	**	**	**	**	**	**	†	00	00
Belle Lucrative	September, October	6	7	8	21	8	4	7	26	....	....	....	*	....	*	*	**	0	....	....	....
Beurre Antoine	October, December	7	7	7	21	8	4	6	25	....	....	....	....	....	....	....	*	....	....	....	....
Beurre Bosc	September, October	....	....	....	....	....	....	....	....	*	**	....	*	**	....	....	....	**	....	....	....
Beurre d'Anjou	October, December	8	9	6	23	7	6	8	34	*	**	**	**	**	**	....	†	*	†	....	....
Beurre Diel	September, December	9	....	....	....	8	....	....	....	....	....	....	....	*	....	....	....	....	....	....	....
Beurre Easter	....	....	....	....	....	....	....	....	....	....	....	....	....	*	....	....	*	....	....	....	....
Beurre Giffard	August	7	7	7	21	10	6	9	25	....	....	*	*	**	....	....	*	....	....	....	....
Beurre Hardy	September, October	10	10	10	30	8	8	9	25	....	....	....	*	*	....	....	*	**	....	....	....
Beurre Clairgeau	October, January	9	8	9	26	8	7	8	32	**	**	*	**	**	*	*	*	*	....	....	....
Beurre Superfine	October	7	8	8	23	8	4	6	26	....	....	....	....	....	....	....	*	....	....	....	....
Brandywine	August, September	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	0	....	....	....	....
Brockworth Park	December	8	8	7	23	7	6	6	19	....	....	....	....	....	....	....	*	....	....	....	....
Buffum	Last of September	9	9	6	24	7	5	7	19	....	....	....	....	*	....	....	*	0	....	....	....
Clapp's Favorite	August, September	10	7	9	26	10	7	9	26	*	*	*	**	**	**	*	**	*	*	†	....
Doyenne d'Ete	July	9	7	8	24	8	....	8	....	....	....	....	....	*	....	....	*	....	....	....	....
Dempsey	October, November	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	....	....	....
Doyenne Boussock	September, October	10	10	10	30	8	9	9	26	....	....	**	**	**	....	....	*	**	....	....	....
Duchess	October	8	8	7	23	8	8	8	24	*	*	....	**	*	*	*	**	*	**	....	....
Duchess de Bordeaux	December, February	....	....	....	....	....	....	....	....	....	*	....	....	....	....	....	*	0	....	....	....
Duchess Precoce	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	**	†	....	....	....
Dorset	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	†	....	....	....

D'Jules Guyot																								
Eastern Belle																								
*Flemish Beauty	September	9	9	8	26	8	9	7	24	*	0		0	0	*	**	*	†		†	
Goodale	October	8	8	7	23	8	7	8	23				*	*	*	*	0	0	*	*	
Glout Morceau	December	8	8	6	22	6	6	8	20								*	0			
Graslin	December	8	7	8	23	8	7	7	22								*				
Grey Doyenne	July	7	6	6	19	8	2	8	18				*				0				
Howell	October, November	8	6	7	21	9		8				*	*	**		*	**	*			
Idaho	October, November	8	9	7	24	7	8	8	23					*			*	0			
Josephine de Malines	December, January	7	7	8	22	8		7						*	*			*	†		
**Kieffer	November	10	10	10	30	4	9	7	24	**	*	*	*	*	*	*	**	0	*	†	†
Lawrence	December	6	8	5	19	8		8		*	*	*		*	*		*				
Louise Bonne	September, October	7	8	9	24	10	7	8	25	*	*	**	*	*		*	**	0			
Lawson										0							*		†		
Le conte	October													0			0				
Manning's Elizabeth																	0	0			
Mount Vernon	November, December	9	7	8	24	8	6	7	21					*			0	0			
Margaret														*							
Osband's Summer	August													*							
P. Barry	December													*			0				
Petite Marguerite	August													†							
President Druard	December, January	7	9	7	23	6	8	5	19					*							
Ritson	October, November	9	10	8	27	8		6		0							*			†	
Rostiezer	August, September	10	8	8	26	10								*			**	*			
Sheldon	October	9	7	7	23	10	7	8	25	*	*		*	*	*		**	0	†		
Souvenir du Congres	August, Septembor	8	7	8	23	7	8	9	24		0		*				*	0			
Tyson	August, September	7	10	8	25	9	8	8	25					*		*	*	0			
Seckel	August, October									*	*		*	*		*	*	0	*		
Vicar of Wakefield	November, January									0			*	0		*	*	0			
*White Doyenne	September													0							
Winter Seckel	January, March	6	7	6	19	7		7									0	0			
Winter Nelis	December, January	8	10	9	27	8		7		*				*			**		†		

* Scabs badly at Southern Stations.

CATALOGUE OF FRUITS FOR THE USE OF PLANTERS.

PLUMS.

Key to Quality:
1 Very Poor.
2–3 Poor.
4–5 Fair.
6–7 Good.
9–9 Very Good.
10— First Class.

Key to Market Value:
1–3 4th Rate.
4–6 3rd Rate.
7–8 2nd Rate.
9–10 1st Rate.

Key to Adaptation:
*—Desirable.
**—Especially Desirable.
†—Promising.
0—Undesirable.
00—Not Hardy.

Varieties tested at Georgian Bay Station. J. G. Mitchell, Clarksburg.	Season in use.	Tree.				Fruit.					Adaptation,											
											Southern Stations.					Middle Stations.				Northern Stations.		
		Vigor, scale 1.10.	Hardiness, scale 1-10.	Productiveness, scale 1-10.	Total value of tree.	Quality, scale 1-10. Dessert.	Quality, scale 1-10. Cooking.	Value, scale 1-10. Home Market.	Value, scale 1-10. Foreign Market.	Total value of fruit	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No 9.	No. 7.	No. 10.	No. —.
Abundance		10	10	10	....	5	7	6	6	.....	*	**	**	*	*	†	*	**	....	†	†	†
Arch Duke	Last of Sep	8	10	. .	.....	6	8	.....	.....	...	..	**	*	.....	.....	.....	**	.....	.....	†	.....	.....
Bradshaw	Aug	9	8	8	25	8	9	10	10	27	**	**	**	**	**	*	**	*	....	†	....	†
Burbank	Sept	10	10	10	.....	5	8	.....	.....	.....	.....	.....	**	**	**	†	*	.....	.....	**	.....	.....
Bleeker's Gage		...	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.	*	.....	.....	.....	.....	.....
Bingham		.....	.....	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	†	.....	.....	.....	.....	.....	.....	.....	.....
Chabot		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coe's Golden Drop	Sept.-Oct	4	8	8	20	7	10	10	... ..	24	*	**	**	*	*	*	**	*	.	†	.....	.....
Columbia	Sept	10	8	10	28	8	9	10	.....	27	.....	*	*	.....	**	.....	*	.....	.....	.....	.....	.....
Damson	August	9	10	10	29	. ...	7	4	.....	11	.....	**	.....	*	.....	*	*	.....	.....	.....	.....	.....
Duane's Purple	August	9	8	8	22	7	8	8	8	21	*	*	*	*	*	...	*	.....	.....	.....	.....	.....
De Soto		.....	.....	.....	.....	..	.....	.....	.....	.....	.....	*	.....	*	.....	.....	*	*	.....	†	*	.....
Fellemberg		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
General Hand	Sept.	10	9	6	25	7	8	10	.. ..	25	*	0	*	0	*	*	0	*	....	*	.....	.....
Glass	Sept.	10	10	9	29	4	8	7	.....	19	....	*	*	**	....	....	**	*	....	*	†	...
Goliath	Aug	8	7	8	23	6	7	7	.....	20	....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
German Prune	Sept.-Oct	7	7	7	20	...	9	8	.....	17	...	**	.....	*	.....	*	**	**	....	†	...	...
Grand Duke		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	†	*	*	.....	†	**	.....	.....	.....	.....	.....
Gueii	Aug	10	10	8	28	5	7	7	.....	19	*	*	.....	*	.....	.....	*	*	.....	*	†	.....
Howard's Favorite	Sept.-Oct	8	10	8	26	6	9	6	.....	24	....	.....	.....	.....	.....	.....	*	.....	.....	.....	.....	.....
Huling's Superb		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	**	.....	.....	.....	.....	*	**	.....	.....	.....	.....
Imperial Gage	Aug	10	8	9	27	10	10	10	.....	30	**	**	*	**	**	**	*	**	.....	*	.....	.....
Jeffers n	Early Sept	7	6	6	19	10	10	10	.....	30	....	*	.....	*	*	.....	*	.....	.....	.....	.....	.....

Lawrence's Favorite	Aug	10	8	8	26	10	10	7		27													
Lincoln																							
Lombard	Sept.	10	10	10	30	8	9	8	8	25	**	*	*	**	*	**	*	**		**	*		
McLaughlin	Aug	8	7	6	21	10	10	9		29		*			*		*	**					
Moore's Arctic	Early Aug.	7	10	10	27	2	5	7		14		*			0	**	*	*					**
New Goderich	Sept.	9	9	10	28	5	8	8		21							*						
Niagara		9	9	8		8	9	10	10		*	*	**	**									
Ouillin's Golden Gage												**											
Orange	Aug	9	8	8	25	4	6	8		18		*											
Prince of Wales	Sept.	6	7	6	19	8	9	10		27		**	*	*	*		*	*			†		
Peach	Aug	7	6	4	17	8	8	8		24							*						
Pond Seedling	Last of Sept.	10	10	8	28	4	7	10		21			*	0	*	*	*	**		*	†		
Peter's Yellow Gage																		*		†			
Prince's Yellow Gage	Early Aug.	9	10	8	27	6	6	7		19		**		*			*			**			
Purple Egg												**	*	**									
Quackenbos	Sept.	10	10	9	29	4	8	7		19		*		**	*		**	*		*			
Reine Claude	Sept.-Oct.	10	10	8	28	10	10	10		30	**	**	**	**	*		**	*					
Reine Claude Violette																							
Red Magnum Bonum												*	*					*					
Saunders		7	10	9		6	8	7	8		*	*		*									
Smith's Orleans	Aug.-Sept.	10	10	9	29	6	9	9		24		*		*		**	*	*					
Spaulding																		0					
St. Catharine	Sept.	8	8	8	24	10	10	9		29		*				**							
Victoria												*					*	*					
Washington	Aug.-Sept	9	7	8	24	10	10	10		30	*	**	*	*	*	*	**	**			0		
Willard		10	10	10		1					*												
Wild Goose																							
Wickson		10	10								*			*	†	†				†			
Yellow Egg	Sept.	8	8	6	22		8	10		18	*	*	**	*	*	*	**	**		*	*		
Yellow Gage	Aug	6	7	8	21	7	10	7		24				**		*	0						

CATALOGUE OF FRUITS FOR THE USE OF PLANTERS.—RASPBERRIES.

Varieties tested at Lake Huron Station. B. A. E. Sherrington.	Season in use.	Tree.				Fruit.			Adaptation.												Remarks.
									Southern Stations.					Middle Stations.				Northern Stations.			
		Vigor.	Hardiness.	Productiveness.	Total value of Tree.	Quality, Dessert.	Value, Home market.	Total value of fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.	No. 14.	
All Summer		4	10	..	14	..	..	0	..	..	..	..	..	0	..	..	..	..	..	..	
Brandywine	July 5-July 28	8	10	10	28	9	8	17	*	..	..	..	..	*	..	..	..	..	..	..	
Brinckle's Orange	" 11-Aug. 4	7	10	5	22	7	4	11	..	..	..	..	..	*	..	..	..	..	..	..	
Cuthbert	" 11- " 6	10	9	10	29	10	10	20	**	..	..	..	..	*	..	..	..	..	..		
Caroline	" 11- " 8	10	10	10	30	4	4	8	0	..	..	..	..	*	..	..	..	..	..	..	
Conrath	" 13-July 28	10	10	10	30	9	10	19	..	..	..	..	..	†	..	..	..	..	..	..	
Columbian	" 22-Aug. 8	8	5	4	17	8	8	16	..	..	..	..	..	..	..	..	..	..	..	..	Badly winter killed.
Golden Queen	" 11- " 4	7	10	9	26	8	8	16	*	..	..	..	..	*	..	..	..	..	..	..	Best yellow berry.
Gregg	" 16- " 4	9	7	5	21	10	10	20	**	..	..	..	..	†	..	..	..	..	..	..	
Gault	" 22- " 8	7	8	6	21	7	8	15	..	..	..	..	..	†	..	..	..	..	..	..	
Hilborn	" 13-July 28	4	10	3	17	5	5	10	**	..	..	..	..	†	..	..	..	..	..	..	Don't think this is the true Hilborn.
Hansell	" 2- " 28	8	10	9	27	7	7	14	0	..	..	..	..	*	..	..	..	..	..	..	
Johnson's Sweet	" 16-Aug. 1	5	4	3	12	1	4	5	*	..	..	..	..	0	..	..	..	..	..	..	
Kansas	" 13- " 1	9	10	10	29	10	10	20	*	..	..	..	..	*	..	..	..	..	..	..	
Lovett's	" 16- " 4	8	7	8	23	7	7	14	..	..	..	..	..	*	..	..	..	..	..	..	
Lottie	" 16- " 1	8	10	5	23	9	6	15	..	..	..	..	..	*	..	..	..	..	..	..	
Loudon	" 9- " 1	7	10	4	21	9	9	18	*	..	..	..	..	†	..	..	..	..	..	..	
Marlboro	" 8- " 4	8	10	8	26	7	9	16	0	..	..	..	..	*	..	..	..	..	..	..	
Miller	" 11- " 4	9	10	7	26	7	9	16	..	..	..	..	..	*	..	..	..	..	..	..	
Mammoth Cluster	" 13-July 28	4	10	4	18	4	5	9	*	..	..	..	..	0	..	..	..	..	..	..	
Ohio	" 16-Aug. 8	9	8	8	25	6	8	14	..	..	..	..	..	*	..	..	..	..	..	..	
Pioneer	" 13- " 4	7	10	9	26	7	8	15	..	..	..	..	..	*	..	..	..	..	..	..	
Phœnix	" 11-Aug. 6	8	10	5	23	9	9	18	..	..	..	..	..	†	..	..	..	..	..	..	
Reliance	" 8-July 25	8	10	7	25	7	7	14	..	..	..	..	..	*	..	..	..	..	..	..	
Rancocas	" 2- " 25	8	10	6	26	7	6	13	..	..	..	..	..	*	..	..	..	..	..	..	
Redfield	" 20-Aug. 4	9	10	7	26	2	2	4	..	..	..	..	..	0	..	..	..	..	..	..	
Shaffer	" 16- " 6	10	4	5	19	6	7	13	..	..	..	..	..	†	..	..	..	..	..	..	Badly winter killed.
Smith's Giant	" 18- " 1	9	8	7	24	10	10	20	..	..	..	..	..	†	..	..	..	..	..	..	" "
Superlative	" 13- " 4	5	5	4	14	9	9	18	0	..	..	..	..	†	..	..	..	..	..	..	" "
Strawberry Raspberry	" 28- " 8	5	10	6	21	0	0	0	..	..	..	..	..	0	..	..	..	..	..	..	
Turner	" 2-July 25	8	10	5	23	9	9	18	*	..	..	..	..	*	..	..	..	..	..	..	
Taylor	" 9- " 25	8	10	8	26	6	6	12	..	..	..	..	..	*	..	..	..	..	..	..	
Thompson	" 2- " 25	7	10	8	25	6	7	13	..	..	..	..	..	*	..	..	..	..	..	..	
White Champlain	" 9- " 25	6	9	4	19	7	5	12	..	..	..	..	..	*	..	..	..	..	..	..	Row not full.
Zettler	" 11-Aug. 4	9	10	9	28	7	9	16	..	..	..	..	..	**	..	..	..	..	..	..	A local berry.

CATALOGUE OF FRUITS FOR THE USE OF PLANTERS.—GOOSEBERRIES.

Key to Quality: 1—Very Poor. 2-3—Poor. 3-4—Poor to Good. 5-6—Good to very Good. 7-8—Very Good. 8-9—Very Good to Best. 10—Best.
Key to Adaptation: *—Successful. **—Especially Desirable. †—Promising. 0—Undesirable.

Varieties tested at Simcoe Station. By Stanley Spillett Nautyn.	Season in use.	Tree.				Fruit.					Adaptation.													
											Southern stations.					Middle stations.				Northern stations.			
		Vigor, scale 1-10.	Hardiness, scale 1-10.	Productiveness, scale 1-10.	Total value of tree.	Quality, scale 1-10 Dessert.	Quality, scale 1-10 Cooking.	Value, scale 1-10 Home market.	Value, scale 1-10 Foreign market.	Total value of fruit.	No. 1.	No. 2.	No. 3.	No. 4.	No. 13.	No. 5.	No. 6.	No. 8.	No. 9.	No. 7.	No. 10.		
Autocrat	July 10 to 25	8	10	8	27	10	10	8	....	28	....	....	....	....	....	....	....	....	....	*	....	....	
Champion	June 20 to 30	10	9	10	28	3	8	8	....	19	....	....	....	....	....	....	....	....	....	*	....	....	Used while green.
Chatauqua	July 5 to 20	7	7	7	21	9	10	10	....	29	....	....	....	....	....	....	....	....	....	†	....	....	
Carnie's Golden	" 5 to 20	5	7	5	17	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Crosby's Seedling	" 10 to 25	8	9	8	25	10	10	10	....	30	....	....	....	....	....	....	....	....	....	†	....	....	
Crown Bob	" 10 to 25	7	9	6	24	10	10	10	....	30	....	....	....	....	....	....	....	....	....	†	....	....	
Columbus	" 5 to 20	8	9	8	26	10	10	10	....	....	....	....	....	....	....	....	....	....	....	**	....	....	
Cook's Eagle	" 10 to 25	5	5	5	15	10	10	10	....	....	....	....	....	....	....	....	....	....	....	0	....	....	
Downing	" 20 to Aug. 5	8	10	9	28	8	8	8	....	24	....	....	....	....	....	....	....	....	....	*	....	....	
Dominion	" 10 to 25	8	8	6	24	10	10	10	....	30	....	....	....	....	....	....	....	....	....	†	....	....	
Golden Prolific	" 10 to 25	5	7	5	20	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Green Chisel	" 20 to 30	5	7	5	20	8	8	8	....	24	....	....	....	....	....	....	....	....	....	†	....	....	
Ingram's Ocean	" 20 to 30	7	7	5	20	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Keepsake											....	....	....	....	....	....	....	....	....	....	....	....	No fruit and the only variety that missed.
Lancashire Ladd	July 5 to 20	5	7	5	21	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Large Golden Prolific	" 10 to 20	8	8	8	24	10	10	10	....	30	....	....	....	....	....	....	....	....	....	†	....	....	
London	" 10 to 15	5	5	5	15	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Lancelot	" 10 to 15	5	5	5	15	8	8	8	....	24	....	....	....	....	....	....	....	....	....	0	....	....	
Mrs. Whittaker	" 15 to 20	7	7	7	21	10	10	10	....	30	....	....	....	....	....	....	....	....	....	†	....	....	
Oregon Jumbo	" 20 to 30	10	10	9	29	9	9	9	....	27	....	....	....	....	....	....	....	....	....	*	....	....	
Ontario	" 20 to 25	8	8	8	24	10	10	10	....	30	....	....	....	....	....	....	....	....	....	**	....	....	
Pearl	July 20 to Aug. 5	9	10	10	28	9	9	8	....	26	....	....	....	....	....	....	....	....	....	*	....	....	
Phœnix	" 15 to 20	7	7	6	20	9	9	9	....	27	....	....	....	....	....	....	....	....	....	†	....	....	
Queen	" 20 to 25	7	7	7	21	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Red Jacket	" 20 to 30	10	10	9	29	9	9	9	....	27	....	....	....	....	....	....	....	....	....	**	....	....	
Red Champagne	" 15 to 20	5	5	5	15	9	9	9	....	27	....	....	....	....	....	....	....	....	....	0	....	....	
Success	" 20 to 30	8	10	9	28	8	8	8	....	24	....	....	....	....	....	....	....	....	....	*	....	....	
Triumph	" 15 to 20	7	7	7	21	9	9	9	....	27	....	....	....	....	....	....	....	....	....	†	....	....	
Whitesmith	" 20 to 25	8	8	8	24	10	10	10	....	30	....	....	....	....	....	....	....	....	....	**	....	....	
White Crystal	" 20 to 30	5	5	5	15	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Whinham's Industry	" 20 to 25	5	5	5	15	10	10	10	....	30	....	....	....	....	....	....	....	....	....	0	....	....	
Yellow Scotch	" 25 to 30	8	8	7	23	10	10	10	....	30	....	....	....	....	....	....	....	....	....	†	....	....	

REPORT

OF THE

INSPECTOR OF FUMIGATION APPLIANCES

1900.

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REPORT

OF THE

INSPECTOR OF FUMIGATION APPLIANCES.

1900.

To the Honorable the Minister of Agriculture for Ontario:

SIR,—I beg to submit herewith my second annual report as Inspector of Appliances for the Fumigation of Nursery Stock.

When the Fumigation Act was first put into force, in the spring of 1899, a few nurserymen were inclined to shirk their duty, not only on the ground of expense, both as to the chemicals used and the construction of the fumigation house, but also on the ground of loss of time at a season of the year when work becomes very pressing. The chief objections urged during the inspection of 1900 were loss of time, and damage to peach and other stock by the process of fumigation, but I have pleasure in reporting the general willingness of the nurserymen to conform to the provisions of the Act. It is conceded by nearly all fruit growers that the Act is a very wise measure, as they are protected against the introduction of nursery stock infested with the San Jose Scale, while the nurseryman can send out his stock with the assurance that he is not to blame if by any chance the Scale is distributed to clean orchards outside of the districts where Scale is known to exist. Moreover, it is a well known fact that at least three-fourths of the nursery stock are sent out by the nurserymen of the Niagara peninsula, the north-eastern portion of which is badly infested with the San Jose Scale.

INSPECTION.

Much attention was paid to the inspection of all fumigation houses and boxes, and as a result considerable repairing was done by the nurserymen before permission was allowed to fumigate.

Many of the houses had been built very hurriedly in the spring of 1899, and little care was taken in their construction beyond making them gas-proof for the time being. It was found, however, that the heat of the summer, and the frosts of winter had racked most of the buildings to such an extent that frequently a complete overhauling was necessary before they were again made air-tight.

The buildings were tested in nearly every case with the fumes of burning sulphur or paper. Sulphur or paper were placed in a basin on the floor of the house, and ignited. When the doors were closed, all leaks could be detected by the presence of the white smoke. Although this smoke is not so penetrating and searching as hydrocyanic acid gas, yet it was considered a good test of the condition of the building, for the owner could see for himself where the leaks were, and where overhauling was required. With hydrocyanic acid gas leaks were determined altogether by the smell, for the gas is colorless.

When sulphur or paper is ignited in a house and the doors immediately closed, the air within is heated, and an expansion occurs. Even in air-tight houses, smoke would issue from all the doors and other places for a few minutes, but as soon as the pressure was relieved, no smoke would appear. In testing a house, therefore, these facts should be borne in mind.

Mr. W. N. Hutt, B S A., acted as inspector of all the fumigation houses in the Niagara district, and did his work well I have pleasure, therefore, in placing on record my appreciation of his valuable services in this connection. Mr. G. E Fisher, of Freeman, inspected the fumigation houses in the south-western and northern portions of the peninsula of Ontario, while I found time to visit the Galt and Berlin nurseries and those east of Toronto.

Regulations and Instructions.

In February, 1900, the following circular of information and instructions was sent to every nurseryman that the fumigation appliances might be in shape for inspection before the opening of the nursery season :

Ontario Agricultural College, Guelph, Feb. 24th, 1900.

Dear Sir,—I beg to call your attention to the Regulations, and to Sections 3, 4, 5, 6, and 7, Chapter 33, 61 Victoria, as amended by Amendment Act of 1899, which refer to the Fumigation of Nursery Stock : and to remind you that the Act is still in force, and compels the fumigation of all nursery stock (except such trees, shrubs, and plants, as are hereafter mentioned) with hydrocyanic acid gas.

It is very necessary that the fumigation building be perfectly air-tight if fumigation by hydrocyanic acid gas is to be effective. I have, therefore, to ask you to put your building, or buildings, in proper condition for treating nursery stock, before March 25th. A rigid inspection of all houses will, if possible be made after that date

The attention of nurserymen is specially directed to possible leakages about the doors, windows and floor, or at the base of the roof. It is quite probable that fumigation houses which were gas proof last spring will leak this coming spring on account of warping of the building through frost action during the winter.

Every door should not only have padding in the edge of its frame, but also have large wooden buttons attached to the outside of the frame, by means of which the door may be pressed tightly into the padding.

The Inspector will test every fumigation building during his visit, and will not allow stock to be distributed to purchasers from any house that leaks, or is not air-tight.

Those nurserymen who intend using a box for fumigation purposes are required to have it well constructed, with two thicknesses of boards—one thickness, at least tongued-and-grooved and tar paper between. The box is specially recommended to those nurserymen who send out small orders, or do only a local trade. It is easily handled and the process is very inexpensive.

The chemicals necessary for fumigation, viz., potassium cyanide and sulphuric acid. will be sent out to the nurserymen in weighed and measured quantities from the Agricultural College, Guelph, and no chemicals. other than those sent from the College, will be allowed, except by special permission of the Inspector.

The formula employed in last year's fumigation will be used again this year, viz., twenty-five twenty-eighths oz. cyanide, one and a-quarter fluid ozs of acid, and one and seven-eighths fluid ozs. of water, for every one hundred cubic feet in the building. In the case of raspberry plants, gooseberry plants, and currants, the strength of dose may be reduced to two-thirds that of ordinary. In ordering their chemicals, nurserymen should state the number of doses of each strength they will require.

It would be well for the nurserymen to send in their orders as soon as possible, so that all material may be on hand at the opening of the fumigation season, and no delays occasioned.

The following plants do not require fumigation : Evergreens, strawberry plants, bulbs, and bedding plants ; but all kinds of fruit trees, all kinds of vines and shrubs (other than evergreens and strawberries) including currants, gooseberries, and raspberries, must be fumigated.

Special attention is also called to the deadly nature of the hydrocyanic acid gas which is used in fumigating the nursery stock, and every precaution should be taken to follow the instructions put on each tin sent from the College.

Yours truly,

W. Lochhead,
Inspector of Fumigation Work.

Regulations for the Fumigation of Nursery Stock.

The following regulations have been prescribed by order of the Lieutenant-Governor in Council, in accordance with the provisions of the San Jose Scale Amendment Act, passed April 1st, 1899.

1. Fumigation must be carried on in a box, room, compartment, or house, suitable for the purpose which must be air-tight and capable of rapid ventilation. The owner or proprietor must notify the Minister as soon as preparation for fumigation is complete. The Minister will thereupon order an inspection of the fumigation appliances. No fumigation under the Act is to be carried on until such inspection has been made and a satisfactory report sent to the Minister.

2. The Inspector, after examining and measuring the box or house, or other compartment in which fumigation is to be carried on, will prescribe the amounts of material to be used for every fumigation, and the instructions as to the same must be carefully followed out. The Inspector may, if thought advisable, supply the material for each fumigation in weighed packages.

3. The fumigation house (which shall include all apparatus or appliances used in the fumigation, such as generators, etc.) is to be subject to the orders of the Minister on the recommendation of the Inspector. Subject to the approval of the Inspector the fumigation house may be on other lots than those on which the nursery stock are growing.

4. The fumigation is to be by hydrocyanic acid gas produced according to the instructions of the Inspector and from such formulas at he prescribes for the purpose.

5. The fumigation is to be continued for a period of not less than forty-five minutes. After the expiration of this time or longer, and when fumigation is complete, the house is to be thoroughly ventilated for fifteen minutes at least.

6. No person is to be allowed to enter the fumigating house until after the ventilation period has expired. Entering before may prove injurious, if not fatal, as the gas is a deadly poison.

7. The fumigation of buds and scions may be done in fumigation boxes of not less than thirty cubic feet capacity, the same to be subject to inspection and approval.

8. Immediately after inspection of the fumigation house, the Inspector will report to the Minister, and the Minister or the Inspector will thereupon give permission in writing for the owner or proprietor to begin fumigation.

9. The owner or proprietor of every nursery will attach to every box and to every package of nursery stock a certificate as follows, and he will furnish every purchaser who so desires a copy of the same.

CERTIFICATE OF FUMIGATION.

This is to certify that this package of nursery stock consisting of was properly fumigated on or about the day of , 1900, in accordance with the regulations prescribed by Order of the Lieutenant-Governor-in-Council, in accordance with 62nd Victoria, Chapter 35.

The following are the sections of the San Jose Scale Act dealing with the fumigation of nursery stock, 62nd Victoria, Chapter 35:

3. No person shall import or bring, or cause to be imported or brought into the Province of Ontario, for any purpose whatever, any plant infested with Scale.

4. No person shall keep, or have, or offer for exchange or sale any plant infested with Scale.

5. The owner or proprietor of any nursery shall not send out, or permit any plant to be removed his nursery without the same being first fumigated by hydrocyanic acid gas in accordance with regulations prescribed by order of the Lieutenant-Governor-in-Council. 62 Vic., Chap. 35.

6 No person shall sell, or dispose of, or offer for sale any plant obtained, taken, or sent out from a nursery unless the said plant has previously been fumigated in accordance with these regulations. 62 Vic., Chap. 35.

7. In case the Inspector finds Scale in any nursery and so reports to the Minister, the Minister may thereupon inform, by writing, the owner or proprietor or manager of said nursery of the existence of Scale in his nursery, and the owner or proprietor or manager of said nursery shall not thereafter permit any plant or plants to be removed from said nursery until the Inspector reports to the Minister that it is safe in the public interest to permit the said nursery stock to be removed after fumigation. 62 Vic., Chap. 35.

In September, along with the Regulations, and San Jose Scale Act, as printed in the February circular, the following memo. was sent to every nurseryman:

MEMO FOR THE GUIDANCE OF NURSERYMEN IN THE FUMIGATION OF NURSERY STOCK.

1. The fomula to be used for apple, pear, plum, cherry, quince, shrubs and vines:
   Cyanide—twenty-five-twenty-eights of an ounce.
   Sulphuric Acid—1¼ fluid ounces.
   Water—1⅞ fluid ounces, for every 100 cubic feet in house or box.

2. The formula to be used for peach, raspberry, gooseberry, currant:
   Cyanide—⅝ ounces.
   Sulphuric Acid—1 fluid ounce.
   Water—1½ fluid ounces, for every 100 cubic feet in house or box.

3. The following plants do not require fumigation:—Evergreens, strawberry plants, bulbs and tubers, herbaceous perennials and bedding plants.

4. Damage may be done to stock (*a*) if fumigation takes place too early in the fall, before the buds are set, and the wood sufficiently dormant, and (*b*) if fumigation takes place late in spring, after the buds have begun to swell.

5. The roots of stock should be exposed for as short a time as possible, both before and after fumigation. Experience shows that much injury has resulted from such exposures.

6. No nurseryman shall use chemicals other than those sent from the Agricultural College, Guelph, except by special permission of the Inspector.

7. Nurserymen should bear in mind that a certificate of fumigation must be attached to every package of nursery stock sent from the nursery.

8. No fumigation house is to be used for fumigation purposes until sanction has been obtained from the Inspector.

W. Lochhead,
Inspector of Fumigation Appliances.

The Equipment for Fumigation.

The equipment necessary for the fumigation of nursery stock consists of :

1. *Chemicals*, including water, sulphuric acid, and potassium cyanide (98-99 per cent. pure).

2. *Generator*, or some suitable vessel, jar, or crock, in which to mix the chemicals and generate the hydrocyanic acid gas

3. *A graduated glass beaker* for measuring out the acid and water, and

4 *Air-tight fumigation house*, or *box*, to hold the stock while fumigation by gas is taking place.

The Chemicals, with the exception of the water, are sent from the Agricultural College to the nurserymen in weighed and measured quantities, suited to the capacity of the fumigation houses or boxes. Great care should be taken with the chemicals, for the acid is deadly corrosive, and the cyanide is deadly poison. They should be kept out of the reach of children.

The Generator may be a glazed earthenware crock, or pickle jar, of 1 to 4 quarts in size, according to the capacity of the house. After a charge of gas has been liberated a bluish liquid will be left in the generator, but will crystallize out as it cools. These contents are readily soluble in water, and should be emptied as soon as possible in a manure pile, but never in an exposed place. Last spring one nurseryman to my knowledge lost two good sheep by exposing the jars with the contents to these animals.

The generator should never be made of tin or iron ; always use glass or earthenware.

The Fumigation.—As soon as the trees are dug and tied in bunches they are piled loosely on the floor of the house or box, with roots towards walls, and tops overlapping. When everything is ready, the water is measured out into the generator, then the acid is slowly poured into the water and kept stirred with a stick ; finally the cyanide is dropped into the liquid from the tin or paper (as the directions state). The door, or lid, is immediately closed, and the room made perfectly air-tight The doors are thrown open again in 45 minutes, and the buildings thoroughly ventilated for about 10 minutes.

It is very important that the roots of the trees be exposed for as short a time as possible, both before and after the fumigation process, for it is essential that they should remain moist The roots, however, should not be puddled before fumigation.

Trees, especially peach, should never be fumigated a second time, nor should they be fumigated when they are drenching wet. Damp or moist trees, however, are not injured by the treatment.

Formulæ Used Elsewhere in Fumigation.

The stronger formula used in Ontario for fumigating nursery stock, viz , cyanide, twenty-five-twenty-eights of an ounce ; sulphuric acid, $1\frac{1}{4}$ fluid ounces; water, $1\frac{7}{8}$ fluid ounces, for every 100 cubic feet in house or box, is the same as the Maryland formula adopted by Prof. W. G. Johnson, who very kindly gave us great assistance in the inauguration of the Fumigation Process in 1899, and who has perhaps done more experimental fumigation work than any other person in the United States or Canada. Although this Maryland formula is apparently far from simple, yet when it is applied practically there is very little trouble with it. The dose for each box and house is computed but once, and that is the end of the apparently complex formula.

Dr. Fletcher uses the simpler formula : 1 oz cyanide, 1 fl. oz. sulph. acid, and 3 fl. oz. water for every 100 cubic feet of space, which is a slightly stronger dose than the one used in Ontario nurseries.

The New York formula recommended by the Geneva authorities is : $1\frac{1}{8}$ oz. cyanide, $1\frac{1}{2}$ fl. oz. sulph. acid, $4\frac{1}{2}$ fl. oz. water.

The Ohio formula recommended by Prof. Webster is : $\frac{4}{5}$ oz. cyanide, $\frac{4}{5}$ fl. oz. sulph. acid, $1\frac{3}{5}$ fl. oz. water.

The Connecticut formula is the same as that of Ontario and Maryland, while the Washington and New Jersey formulæ are the same as Dr. Fletcher's.

These formulæ, apparently at variance, are after all very similar. The amount of gas generated depends on the amount of cyanide used, provided there are sufficient water and acid to make the chemical action complete. The use of the water is to keep in solution the potassium sulphate, which is formed by the action of the acid on the potassium cyanide; otherwise, the action of the acid would soon cease on account of the coating about the cyanide In some reactions, where there is not an excess of water, acid potassium sulphate is formed. This will naturally require a different proportion of acid and cyanide. The Ontario formula is supposed to be the safest, and most economical under the conditions which obtain in our nurseries.

Nurserymen everywhere agree that the best known way of killing San Jose scale on dormant nursery stock is by fumigation with hydrocyanic acid gas. The process is thorough and inexpensive. The treatment is valuable against other insects, which do not winter in the egg. Until some other better method is devised, it would be unwise to discard this method for any other which does not give promise of immediate relief.

Effect of the Gas Treatment on the Nursery Stock.

My last annual report dealt with this subject at some length. The conclusions then stated were that the injuries were due to one or more of the following causes:—1, the very severe *winter-freezing* of 1898-9, which destroyed very many young trees in all sections of the country; 2, the *prolonged drouth*, which was preceded by a long spell of wet weather; and 3, the *advanced conditions of the buds* at the time of fumigation. To these I would add a fourth, *the exposure of the roots too long, both before and after fumigation.*

Reports of supposed injurious effects of fumigation were received from three or four nurserymen, but when the cases were looked into carefully there was no doubt but that the chief cause of the injury was the damaged condition of the roots produced by the severe winter of 1898–9. It is a fact well known to all nurserymen and fruit-growers that young trees may have their root-systems badly injured and yet show very few effects for some time so long as they are allowed to remain in the nursery row, but so soon as they are removed they die almost immediately. Now, the peach nursery stock sent out last spring (1900) passed through the severe winter, and it is but fair to assume that it too must have suffered to some extent.

When I received notice last June of the supposed damage to nursery stock, peach in particular, by fumigation, I wrote immediately to Professors Johnson, of Maryland; Forbes, of Illinois; Smith, of New Jersey; Webster, of Ohio; Slingerland, of New York, and Pettit, of Michigan. Professor Smith was absent in Europe, from whom no reply was received, Professors Slingerland and Pettit had no experience with nursery fumigation, hence were not prepared to give information. I stated in my letter to each of these gentlemen the facts of the case as were related to me. Few of the buds had developed, but some adventitious buds were showing themselves. There had, of course, been no growth, but it is probable that they will all come through, with the loss of a season's growth, however. "Can you suggest a cause for the injury? Is the dose too strong? Can it be possible that your peach is more *resistive* than ours? I shall be glad to get full information on this matter."

The following letters were received, from which it will be observed that little credit is given to injury by fumigation such as is done in Ontario:

Urbana, Ill., July 6th, 1900.

Dear Sir.—I have your enquiry of June 29th, and I regret to say that I have no definite information bearing upon the point you mention. Vague statements have sometimes been made to me by nurserymen to the same general effect as that in your letter, and I undertook this spring to determine by experiment the truth of such suppositions. I underestimated, however, the variability of trees in starting in the spring and consequently did not make my experimental lots large enough to bring out any difference which might have appeared between fumigated trees and the check lot. I had fifty of each variety in each lot, and with that number could detect no difference attributable to the fumigation.

Unfortunately my peach stock was all practically dead, so few of the trees started in the spring in either the check or the experimental lots that I could not observe any difference.

Very truly yours,

S. A. Forbes.

Ohio Agricultural Experiment Station, Wooster, Ohio, July 2nd, 1900.

Dear Professor,—I think we have only once had any complaint of injury to peach trees by fumigation. We note, however, that fumigation is likely to injure fresh growth That is to say, that, if trees are taken after they have begun to put out their foliage in spring, and fumigated, they will be injured. I should imagine that peach trees removed early in the fall and fumigated, might perhaps be slightly injured, but in only one instance have we had any reports of injury and that was where the stock was fumigated very late in the spring. I should hardly suppose that our trees would be less resistive than yours, but have no definite information on that point, I would hardly know how to avoid this trouble, if we should come in contact with it, unless, possibly, it would be to postpone fumigation until a somewhat late day in the fall. It occurs to me that early in the autumn the peach buds may not be as mature as a little later. In other words, after they first put out they harden a little in preparation for winter. If this is the case, then it would naturally follow that there would be less injury after the hardening than before. This is not very definite, but it really is the best that I can do for you as I have not been confronted with the problem myself.

Yours truly,

F. M. Webster.

College Park, Md., July 3, 1900.

Dear Prof. Lochhead,—I am in receipt of your letter of June 29th, and note what you state regarding fumigation of young peach trees. In reply would say that we have had no difficulty along this line this season, and I can not, under the circumstances, offer any suggestions as to the solution of the problem in your section. You may, however, recall the fact that I have repeatedly cautioned the nurserymen about fumigating very small nursery stock, especially peach, with the normal dose, twenty-five hundredths (.25) gramme per cubic foot. Peach, especially small grade stock, like whips and June buds, can not be fumigated with a strength stronger than sixteen or eighteen hundredths (.16 or .18) gramme per cubic foot and this method we have been following in this State, which I have repeated in my publications, copies of which no doubt you have. Did you receive a copy of my last Bulletin published by the Pa. State Agricultural Department on Nursery Fumigation, etc.? I do not believe there is anything in the resisting properties of peach in this section more than that found in your section. If anything, I would expect that yours would be more resisting than those from the South, in as much as your season is shorter, and therefore the growing period is not as great as it is here. The wood, therefore, in your section I would judge would be more mature, and perhaps better able to withstand the gas. There might also be a possibility that the reverse would be true, and that the longer growing season here would make a stronger and more resistant wood. This, however, I can hardly believe; but it may prove to be fact, when comparisons are made. I know of no experiment that can be made along this line at the present; but growers must be cautious about re-fumigation of peach and the exposure of the roots for any great length of time. I should like to hear from you about this matter later if you have any new developments.

Very truly yours,

W. G. Johnson.

With regard to the effect of hydrocyanic acid gas on the various kinds of nursery stock, the following very careful results were secured, and confirmed by many subsequent experiments by Prof. Johnson, of Maryland:

1. The tender terminals of first-class peach stock *were not affected in the least* until $1\frac{2}{3}$ *ounces Cyanide*, nearly double the normal dose, was used and exposed *for one hour.*

2 *Apple* was not affected, even when six times the normal dose was used.

3. *Plum* required nearly three times the normal dose to produce injury to the terminals.

4. *Pear* stood from three to four times the normal.

5. *June Buds and Low Grade Peach* will not stand a dose higher than two-thirds normal. The wood in these is not well matured.

6. *Buds, Grafts* and *Scions* should be treated to a two-thirds normal dose.

Suggestions re the Construction of Permanent Fumigation Houses.

It is evident that the San Jose Scale is to remain permanently with us in Ontario, for there is no thoroughly effective means of exterminating it. Future treatment will be along the line of control rather than extermination. The pest is confined at present chiefly to the Niagara peninsula, Burlington, Guilds (in Kent), and Kingsville; and it is the duty of the authorities to prevent its spread to the other fruit producing districts of

the Province. Believing that the most important agency of spread is infested nursery stock, the Government very wisely demands the fumigation of all nursery stock with hydrocyanic acid before it leaves the nursery. The fulfilment of this Fumigation Act necessitates the erection of suitable fumigation houses or boxes. At the outset many nurserymen constructed temporary buildings, under the impression that the danger of infestation from nursery stock would soon pass away; but, as I have already stated, the San Jose Scale is here to stay, and permanent, well constructed fumigation houses must be built.

The greatest difficulties found in maintaining fumigation houses in efficient condition from year to year are the cracking of the paper through expansion and contraction of the materials by heat and cold, and the warping and loosening of the boards by the sun and rain. Mr. W. N. Hutt tells me that although all houses in the Niagara district were put in the best of condition for spring fumigation, there was not a single one but needed repairing in the fall, and some houses had to be almost reconstructed. The majority of the houses which have been built at all carefully and with permanency in view (see Report 1899, p. 5) have a framework of 2x4 studding. On the outside of the studs is nailed carefully a covering of tongue-and-grooved sheeting, followed by a course of building paper lapped one half, then with upright matched boards battened with four inch strips.

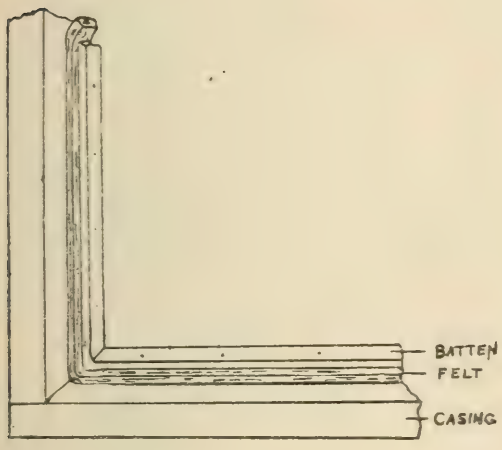

FIG. 1.

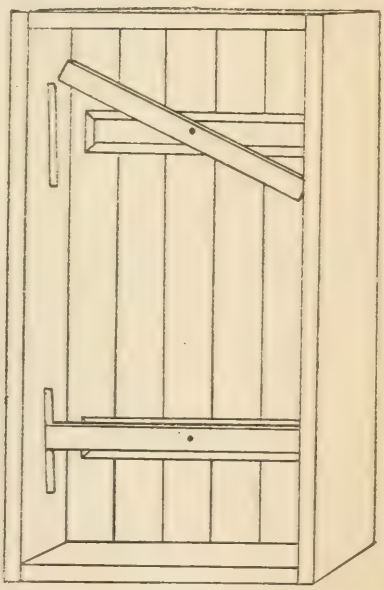

FIG. 2.

When there is an additional covering of tongue-and-grooved sheeting nailed on the inside of the studs the building is rendered more solid and at the same time air-tight. The ceiling must be carefully made, and the building paper should run continuously without a break over the roof down the sides. A floor composed of same material as ceiling or walls would add to the stability, and prevent warping to some extent.

In the course of our inspection we met with houses which were lath-and-plastered within, and had outside sheeting. Such houses, in nearly every case passed the smoke test very satisfactorily, and appeared to me ideal permanent constructions. A carefully made lath-and-plaster house having a slated rack protecting the plaster with a dead air-space between the plaster and outside wall of tongue-and-grooved sheeting, and fitted with proper doors and ventilators, would remain in a gas-tight condition in spite of wind and weather.

Another difficulty which often confronts the nurseryman in the construction of a gas-proof building is the making the doors tight. Some valuable hints on this matter have been received from the nurserymen themselves. At my request, Mr. Hutt prepared the following notes from observations he made while inspecting the fumigation houses of the Niagara district :

Fig. 1 shows a good method of padding doors and ventilators. Felt used by harness makers and known as heavy collar felt is cut into strips about 3 in. wide, and laid into the casings so that it forms the jamb, and the door crowds it evenly all around. A batten leaving about $\frac{1}{4}$ in. of the edge of the felt exposed is nailed on top of it to hold it firmly

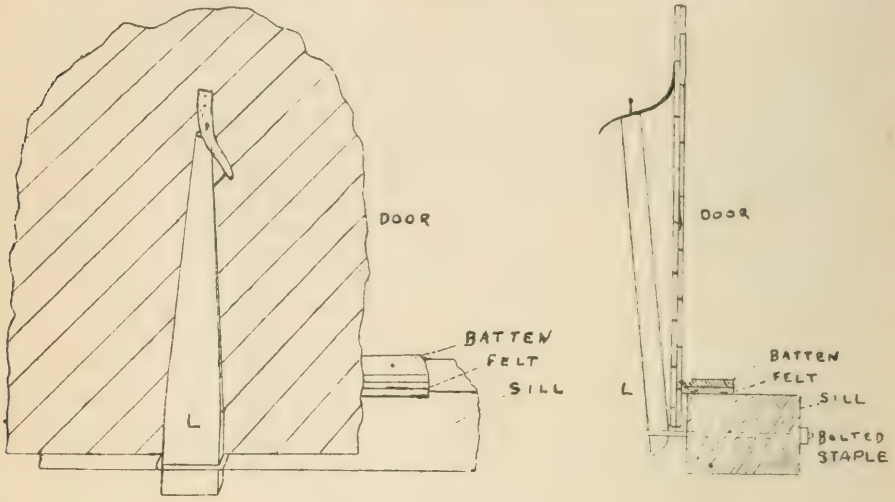

FIG. 3.

in position. Collar comes in rolls of 54 in. width and costs about $2.25 per yard. A $\frac{1}{4}$–$\frac{1}{2}$ yd. would be sufficient for an ordinary sized fumigation house. This variety of felt splits readily, and can be used to even up warped door and ventilator casings. This method of padding is used in the large fumigation house of Morris, Stone & Wellington, at Fonthill, and has been found to give the best of satisfaction.

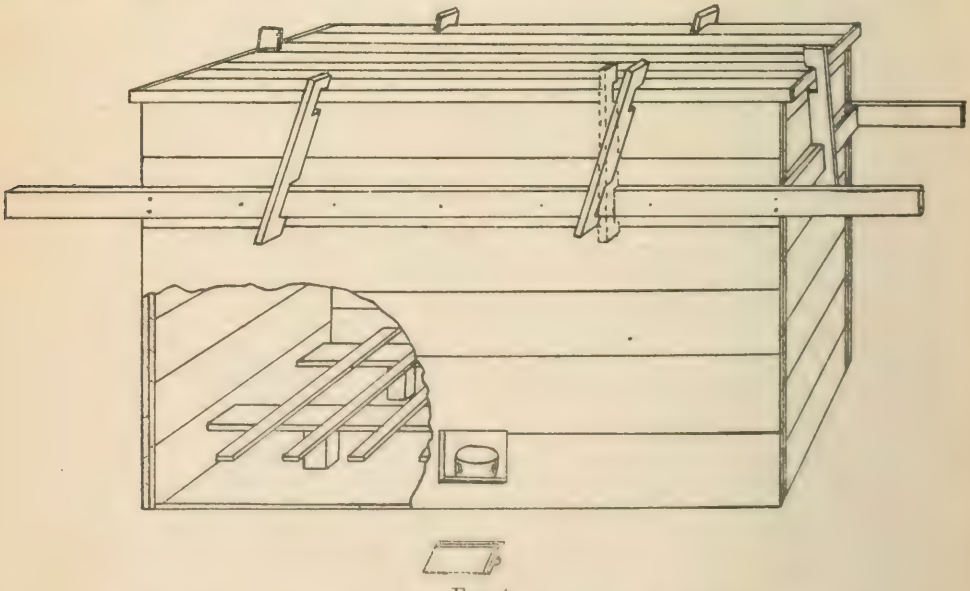

FIG. 4.

Fig. 2 represents a very close fitting door used by Mr. A. G. Hull of St. Catharines. The door, which is made of matched unbeaded lumber, fits the casing closely, and is forced into position against the padding by the movable cross-pieces fitting into the grooves in the casing. The grooves are cut slightly off the perpendicular so that the farther

the cross-pieces are pulled into them the tighter the door is wedged against the felt. A second door is hinged on the outside of the casing, and when closed makes an air-space between the two doors.

Fig. 3 illustrates a very ingenious device employed by Mr. C P. Carpenter, of Winona, for wedging doors. The lever L cut out of a 2x4 scantling is fitted at the lower end into a staple bolted through the sill. The lever forces the door against the felt, and is held in position by a strap at the top. This has proved to be a very handy and effective method of wedging a door.

Fig. 4 shows a handy box for fumigating small lots, devised by Mr. J. W. Harper, foreman of the Helderleigh Nurseries, Winona. It is made of double matched sheeting with tar-paper between. The top is held tightly against the felt padding by knocking the wooden hooks from an upright into a slanting position. The hooks are made of hardwood pieces 1 x 3 in., cut so as to hook over the edge of the lid and under the long side-strip. The rack in the bottom of the box keeps the stock away from the chemicals and insures a thorough penetration by the gas.

Fig. 5 is a diagram of a close-fitting and easily-worked ventilator used in the fumigation house of Brown Bros.' Nurseries. Before the chemicals are put in the

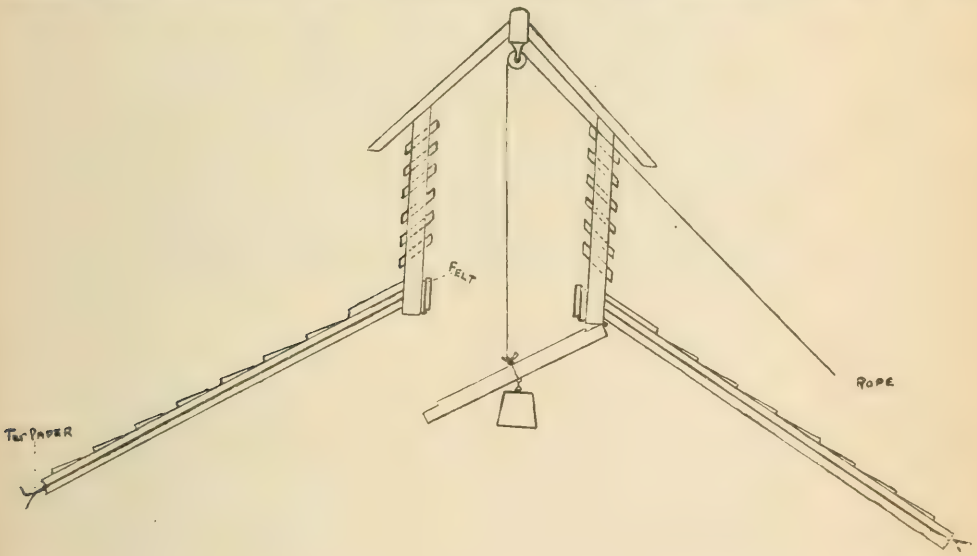

FIG. 5.

house the hinged trap is pulled up tightly against the felt, and the rope fastened to a cleat on the side of the house. Before the house is opened the rope is loosened, and the weight brings down the trap and allows the gas to escape. A ventilator of this kind having the trap opening into the inside is protected from the weather, and is not subject to the troublesome warping of exposed cap ventilators.

FUMIGATION HOUSES.

I have again taken the liberty of inserting views of two well-constructed fumigation houses. Fig. 6 shows clearly the house used by Mr. J. H. Wismer, of the Port Elgin Nursery. It is perhaps the most air-tight fumigation house in the Province. Its capacity is 904 cubic feet, and is built of three courses of siding and two courses of building paper. The doors are also built according to the latest instructions. The building on the left is the fumigation house; the centre building of the photo is a 40x60 packing shed.

Fig. 7 is the fumigation house of Mr. Wallace Woodrow, of Picton. The house is built of brick with stone foundation and plastered inside on the walls. The ceiling is lined with tarred paper covered with boards. There are two doors, the inner one of wooden frame covered with well oiled cotton. The back ventilator opening is padded on the edges.

General Recommendations.

In view of the fact that the San Jose scale is still with us and threatens to spread in spite of treatment with whale-oil soap and crude petroleum, I would recommend that—

I. Official fumigators be appointed to superintend the fumigation at every nursery. The regulations could be carried out in every respect, and the Government could then provide the certificates of fumigation. The Ohio law requires that certificates of fumigation be signed by either a State or Government officer, and does not recognise the nurseryman's own certificate. In one or two instances one of our nurserymen was put to some considerable inconvenience and expense through not being able to furnish a Government certificate to the Ohio officials.

II. All nurserymen be compelled to register with the Department of Agriculture every year, stating the nature of the stock which they are offering for sale. It is quite probable that nurserymen are doing business without the knowledge of the Department.

Some points that should be remembered by Nurserymen.

1. Never allow a tree grown by you to get out of your nursery before it is fumigated.

2. Do not fumigate trees until the wood is well-matured and the buds thoroughly dormant.

3. Never fumigate trees after the buds have begun to open in the spring

4. Never expose the roots of trees longer than is absolutely necessary.

5. Send in your orders for chemicals early, and state clearly the number of doses of each formula required.

6. Never fumigate apples, pears, plums, quinces, etc., according to second formula.

7. Repair your fumigation house early before the Inspector calls.

8. The Inspector will probably begin work about March 15th, and Sept. 15th in the Niagara region.

9. Never leave the Cyanide or the acid where children can reach it.

10. Never allow the residue after fumigation to remain long in the crock or generator.

11. Never put a new charge in a generator containing the old residue.

12. Never use tin or iron vessels as generators, they will be rendered useless in a few minutes.

13. Never allow any one to enter a fumigation house under ten or fifteen minutes after the doors and ventilators are open.

14. Never omit to attach the certificate of fumigation to every parcel of stock shipped.

W. Lochhead,
Inspector of Fumigation.

FIG. 6. Fumigation House of Mr. J. H. WISMER, Port Elgin.

FIG. 7. Fumigation House of Mr. WALLACE WOODROW, Picton.

A LIST OF THE NURSERIES OF ONTARIO, 1900

Morris, Stone & Wellington, Fonthill	Fumigation houses, 2 800 cub. feet.
Stone & Wellington, Toronto	do at M. S. & W.
Pelham Nursery Co., Fonthill	do
A. L. Root, Fonthill	do
B. W. Secord. do	do house.
J. E. Crow, Ridgeville	do house, 560 cubic feet.
J. W. Page, do	
H. A. McCoomb, Ridgeville	Fumigation at M. S. & W.
C. Campbell, Queenston	
F. Walker, Virgil	Fumigation house, 866 cubic feet.
G. B. Wilson, Virgil	
W. Lee & Son, Virgil	
Angus Shaw, Virgil	
Esau Hube, St. Davids	
E. Morden, Niagara Falls South	Fumigation box, 120 cubic feet.
A. M. Smith, St. Catharines	
Smith & Reed, do	Fumigation house, 1,550 cubic feet.
A. G. Hull & Son, do	do 960 do
Alex. Glass, do	do 240 do
R. Buchanan, do	
J. J. Collins, do	Fumigation house, 460 cubic feet.
Brown Bros. Co., Brown's Nurseries	do 2,816 do
Chase Bros. Co., Colborne	Fumigation by Brown Bros. Co
F. W. Bowman & Son Co., Toronto	do do
E. D. Smith, Winona	Fumigation house, 2,300 cubic feet.
E. M. Smith, do	
R. R. Smith, do	Using E. D. Smith's.
Geo. Chambers do	Fumigation house, 1,056 cubic feet.
C. P. Carpenter & Son, Winona	do 1,318 do
J. J. Dean, Winona	Fumigation by Fruitland Nursery Co.
W. F. Geddes, Winona	Fumigation by C. P. Carpenter & Son.
T. B. Henry, do	do by E. D. Smith.
I. E. Henry, do	do by E. D. S. and C. P. C. & Son.
Ira Irving, do	
Keep Bros, do	
J. S. Cockburn, do	
I. E. Vanduzer, do	
Winona Nursery Co., Winona	Fumigation in E. D. Smith's.
Brown Bros., do	do do
Jonathan King, do	
Thos. Rolph, do	
A. B. Foran, do	
B. Muir, do	
J. Milburn, do	
C. J. Carpenter, do	
Grimsby Nursery Co., Grimsby	Fumigation by C. P. Carpenter and Son.
Norman Nelles, do	
Geo. Smith, do	
Boyes Nelles, Grimsby	Fumigation by E. D. Smith.
Jonathan Book, do	
W. A. Holton, Hamilton	Fumigation house, 640 cubic feet.
Webster Bros., do	do 240 do
Haskins Wine Co., do	do 642 do
Ward Bros., Bartonville	Fumigation by Haskins Wine Co.
J. W. Burns, Stoney Creek	
Brock Galbraith, do	Fumigation house, 320 cubic feet.
Fruitland Nursery Co., Fruitland	do and box, 1,620 and 70 cubic feet.
Wm. Ellis, St. Davids	
H. H. Hurd, Hamilton	Fumigation house, 1,700 cubic feet.
C. H. Davidson, Burlington	do by Hurd and Haskins.
S. T. Anderson, Waterdown	do by Hurd.
Cavers Co., Galt	do by Caldwell & Co.
Caldwell & Co., Galt	do house, 1,300 cubic feet.
H. L. Janzen, Berlin	do box, 90 cubic feet.

M. Milgau, Bright	Fumigation house,	1,377	cubic feet.
E. Hersee, Woodstock	do	630	do
A. M. Graham, St. Thomas	do	62	do
H. L. McConnell, Grovesend	do	160	do
C A. Baker, London	do	510	do
J. Gammage & Sons, London			
D. Dempsey, Stratford	Fumigation house,	100	do
J. McAinsh, Wellburn	do	145	do
Strathroy Nursery Co., Strathroy	do	1,075	do
Estate of J. Stewart, Goderich	do	300	do
J. W. Skinner, Mitchell			
A. H. Jacobs, Blyth			
B. Gott, Arkona	do	140	do
Chas. Ellis, Meaford	do	475	do
J. H. Wismer, Port Elgin	do	900	do
W. Fleming, Owen Sound	do	500	do
S. H. Newman, do	do	250	do
H. Pike, do			
M. W. Robinson, Kettleby	Fumigation house,	300	cubic feet.
Leslie Nurseries, Toronto	do	1,760	do
Steele, Briggs, Seed Co., Toronto	do	75	do
W. Rennie & Sons, do			
J. A. Simmers, do			
A. Gilchrist, Toronto Junction			
Manton Bros., Eglinton			
Stanley Spillett, Nantyr			
R. Breckon, Toronto			
Colin McDonald, Toronto			
W. L. Clarke, Leamington			
Thos. Rowley, do	Fumigation box, 36 cubic feet.		
Geo. D. Ellis, do			
Dennis Smith, do			
E. E. Adams, do			
A. Fox & Son, do			
J. Mitchell, do			
J. M. Fields, do	Fumigation box, 123 cubic feet.		
C. B. Palmer, Kingsville			
Geo. E Jones, do			
B. Jasperson, do	Fumigation box, 480 cubic feet.		
Geo. Cady, Ruthven	Fumigation house.		
McKenzie Ross & Sons, Chatham	do	75	cubic feet.
F. W. Wilson, Chatham	do	1,325	do
N. T. Selby, Newcastle	do	560	do
R. J. Mackie, Oshawa	do	385	do
L. K. Shourds, Wellington	do	1,000	do
Wallace Woodrow, Picton	do	500	do
W. C. Reid, Belleville	do	190	do
J. W. Johnston, Campbellford	do		
H. A. McIntosh, Dundela	do	190	do
Thos. Dangerfield, Kemptville	do	640	do
John Conn, do	do	640	do
W. J. Kerr, Renfrew	do	36	do
David Tait, Iron Bridge, Algoma	do		

THIRTY-FIRST ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF

ONTARIO

1900.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF

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THIRTY-FIRST ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY OF ONTARIO

1900.

To the Honorable John Dryden, Minister of Agriculture :

Sir,—I have the honor to present herewith the thirty-first annual report of the Entomological Society of Ontario.

The thirty-seventh annual meeting of the Society was held in the City of London on the 13th and two following days of November, 1900, when the officers for the ensuing year were elected and the necessary business of the Society was transacted. The report of the proceedings includes the audited financial statement of the Treasurer and reports of the various branches, sections and officers of the Society; also the papers and addresses on various Entomological topics presented during the meetings.

The *Canadian Entomologist*, the Society's monthly magazine, has been regularly issued and is now completing its thirty-second volume. Its circulation in all parts of the world, and its value as a scientific publication have been well maintained.

I have the honor to be, Sir,

Your obedient servant,

CHARLES J. S. BETHUNE,

Editor.

London, Ontario.

ENTOMOLOGICAL SOCIETY OF ONTARIO.

OFFICERS FOR 1900-1901.

President—Rev. T. W. Fyles, D.C.L., F.L.S, South Quebec.

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Auditors—J. H. Bowman and W. H. Hamilton, London.

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Delegate to the Royal Society—Rev. Dr. Bethune, London.

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Committee on Field Days—Dr. Wolverton, Messrs. Balkwill, Bowman, Elliott, Law, Moffat, Percival, Rennie and Saunders, London.

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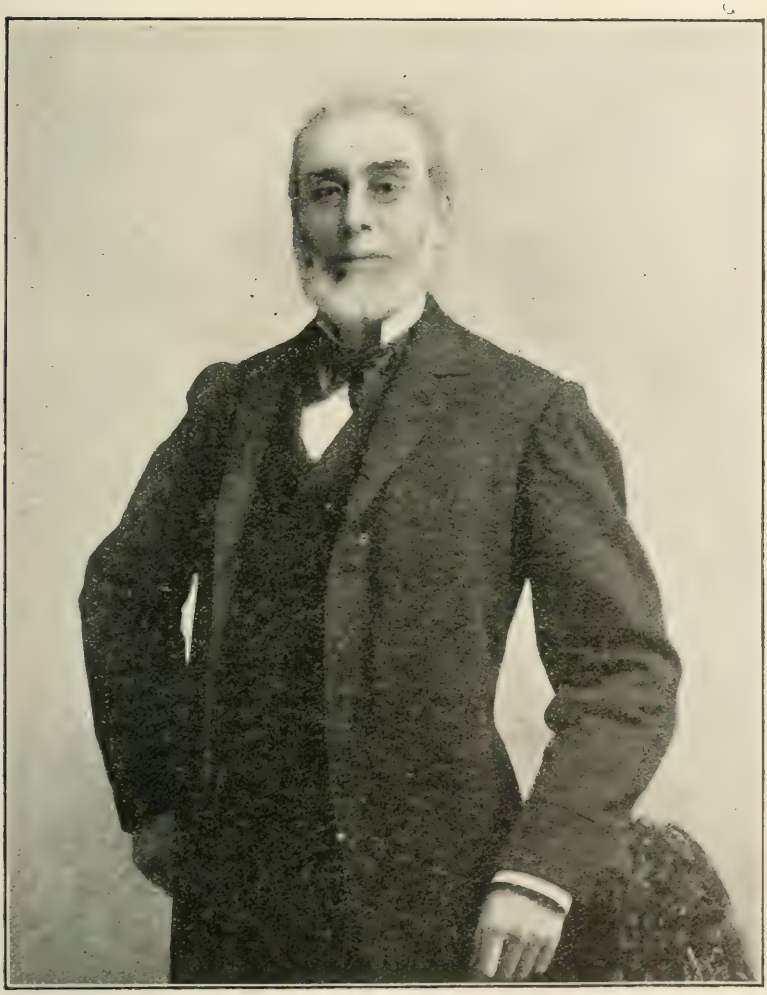

J. ALSTON MOFFAT, ESQ., LONDON, ONT.
Librarian and Curator of the Entomological Society since 1890.

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THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

ANNUAL MEETING.

The thirty-seventh annual meeting of the Entomological Society of Ontario was held in London, the headquarters of the Society, on the 13th, 14th and 15th of November, 1900.

On Tuesday evening, the 13th, a joint meeting was held with the London Horticultural Society in a lecture room at the Normal School. Notwithstanding the inclemency of the weather, a snowstorm prevailing at the time, the hall was completely filled by a very appreciative audience, representing both Societies and the general public as well. The proceedings were much enlivened by instrumental and vocal musical selections kindly furnished by Miss Morphy and Mrs. Edna S. Robb, who was accompanied by Mr. J. W. Fetherston. The Horticultural Society is a new organization which has not yet completed its first year of existence, but has shewn itself to be full of energy and enterprise. Two very successful flower shows were held during the summer and several public meetings at which addresses were given on horticultural and kindred topics. The directors and officers are all members of the Entomological Society and so intimate are the relations between the two that the younger organization may be regarded as a section of the older and larger institution.

The chair was taken by Mr. C. C. James, Deputy Minister of Agriculture for Ontario, who delivered the opening address. He began by explaining the intimate relation that exists between horticulture and entomology, showing that we could have few fruits or flowers if there were no insects, and that there could be no insects if there were no vegetation. While many insects are most beneficial to fruits and flowers, other kinds are most destructive. As noxious or beneficial, the insect world has the closest possible connection with the vegetable kingdom. He then spoke of the various aspects of horticulture and referred, in the first place, to the *labor* side. In the sweat of the brow must the soil be cultivated ; no good results can be obtained without hard work, but the earth responds most bountifully when well directed labour is bestowed upon it.

The next aspect is the *financial.* Horticulture must be profitable from a pecuniary point of view, otherwise there would not be so many professionally engaged in it. Their evident success and the expensive character of their equipment shows that they are providing for a real want of the community. All over the country there are extensive conservatories for the production of flowers, and here and there large nursery gardens for the supply of fruit trees and ornamental shrubs and plants.

But is there anything *intellectual* in horticulture ? In the early days of this country the pioneer farmers devoted themselves exclusively to the raising of grain, and they began in the same way in Manitoba. All that they produced in excess of their own requirements was bartered for the necessary supplies of their families. After a time the care of cattle and pigs was added to the work of the farm and by degrees, after the lapse of many years, this department grew into the great live stock industry that we find to be so prosperous and so important to-day. The next development was the planting out of a few acres of apple trees and the addition in this way of an orchard to nearly every farm. The benefits derived from this improvement, both in the supply of a most wholesome and agreeable variety for the domestic table and the production of a lucrative crop, were soon realized ; more and more land was given up to fruit culture, a higher taste was developed, a more lofty plane of life was reached. The monotonous routine of the early farmer's life was changed to one filled with variety as the seasons came and went, and men found that reading and knowledge were required for the successful prosecution of their varied pursuits. A further mark of progress was the adornment of the homestead with flowers and shrubs. The ornamentation of the home with these objects of natural beauty and the elevation of taste engendered by them indicated the highest stage of country life. The combination of all these things that have been referred to provides a

mode of life that cannot be dull and that requires a high degree of intelligence and ability for its successful prosecution.

Intellectual people, the speaker continued, are much inclined towards horticulture. When such retire with a competence from the business of life they usually find some place on the outskirts of a city or town where there is room for a garden, and there they enjoy their leisure in the cultivation of fruits and flowers. In proof of this devotion to gardening on the part of men who possessed the highest intellectual gifts, the speaker referred to several well-known authors. Blackmore, whose novels hold a place in the first rank, thought more of his fruits and flowers than he did of his books. Rider Haggard not long ago retired to an estate in England, and now he prefers to be spoken of as a farmer or gardener rather than as a writer of fiction. John Burroughs, the charming American writer, shows in his works his devotion to birds and flowers. Charles Dudley Warner lived for ten years in Hartford before he became popular, and then it was due to his papers as an amateur gardener published in the Hartford *Courier*. These attracted much attention and were published in book form, with an introduction by Henry Ward Beecher, under the now well-known title "My Summer in a Garden."

The greatest Canadian historian is undoubtedly Francis Parkman. Though not a dweller in our country, he devoted himself to the study of its early annals and produced a series of works that cannot be too highly praised for the beauty of their style and the intense interest of their contents. His recently published biography deserves to be widely read; it shows that the great moral of his life was the surmounting of difficulties. Almost blind, crippled with rheumatism, prostrated with nervousness, without a really well day for twenty-five years, he yet managed to accomplish a vast amount of admirable literary work. At the early age of twenty-six he made an expedition along the famous "Oregon Trail" in the search for materials for a contemplated book. The hardships he then endured undermined his health and he was compelled to lay aside his literary work for a time. Horticulture became his exclusive pursuit for several years and by its aid he gradually regained his former health and vigour. He made the growing of roses and lilies his specialty, and at one time possessed a thousand varieties of roses and a great number of hybrids that he had obtained from lilies and other flowers. The meritorious character of his work was attested by his winning no less than 326 awards at the flower shows of the Massachusetts Horticultural Society. In 1871 he was actually appointed Professor of Horticulture by Harvard University and he held the position for a year. After that he returned to his literary pursuits and gained a reputation second to none as a painstaking, accurate historian of the romantic period of the early French regime in Canada.

Horticulture when broadly pursued is an education in itself; it requires undoubted powers of observation and induction, and as it demands intelligence, men of intelligence take a delight in it. It has also a *moral* aspect. Take the case of a boy—if he has a fondness for flowers and fruits, insects and birds, he cannot be an immoral person. His tastes are too high for that; his love for the beautiful things in nature raises him to a higher level and exalts his aspirations far above the sordid things of earth. Believing this to be the result, we can realize how important it is that space should be given in our School system for "Nature Study." It instinctively appeals to the hearts of all children, and by its cultivation leads them on to higher things and makes them better fitted to take their place with their fellows in later life—to do their duty more intelligently, more uprightly, towards their country, their neighbours, and at their own fireside.

THE PLANTING, CARE AND PRUNING OF THE TREES IN THE PARKS AND STREETS OF THE CITY.

By Mr. W. E. Saunders, of London.

The subject upon which I have to speak to you to-night is of great importance from every point of view, and while I only intend to touch upon certain phases, I feel sure the interest you have in the matter will lead you to follow it out in other lines also.

In nature, trees grow in one of two ways—either in a crowded forest, or in places more or less open, where they get plenty of light. Although light is free to all, yet

among the trees it is the only necessary for which they enter a great competitive struggle, upon which their very lives depend. When once started a tree cannot help getting a certain quantity of food and moisture, but unless it receives light also, it dies.

In the forest, trees grow as closely together as they can live, and there is a constant struggle to reach the top ; those that succeed in doing so will spread out, and by shading the lower ones, kill them just as surely as though one cut them off with an axe. This method of growth shades the ground closely, keeping it damp and cool, and each year's crop of leaves buries beneath it as it falls the dead limbs and bark chips which fell during the summer and preceding winter, and these, kept always damp by this mulch of leaves, soon decay, and with the leaves themselves form what we know as leaf-mould, the whole process being nature's method of making fertile soil. This is the normal forest condition, and the product of its development is timber, straight-grained, strong and nearly knot-free wood, the joy of the carpenter's heart and one of the best gifts of the Creator to man.

But once in a while, in natural conditions, and more often when the agency of man is involved, a tree gets a chance to grow in a place where there is an abundance of light on all sides, and what result do we find ? This tree, instead of growing tall as rapidly as possible, for fear that some competitor will cut off its supply of light, grows broad nearly as fast as it grows tall, and sometimes faster ; all sides are covered with leaves, and all the branches beneath are draped with leaves in nature's own unequaled manner. Between these two styles of trees there is little resemblance ; the shape is different, the leaves are all over, instead of merely at the top, while the wood, though equally good for burning, is so full of knots from the well developed limbs that it is nearly useless for lumber, but for beauty there is no comparison. The one shows nature in a creative mood making soil and timber for the use of generations yet unborn ; and the other shows her in an artistic mood, and the product is something whose beauty is rarely, if ever, equaled by the artifice of man.

Scarcely can the dullest-minded person pass a beautiful tree without rendering his meed of admiration, and many of these growths are of such surpassing beauty that one is tempted to wonder if the Creator could possibly make anything finer, and yet so inscrutable are the ways of some men that they cut, maul, disfigure and distort these gifts of God, and they appear to think that He does not know how a tree should grow and that it is their duty to teach Him.

In our parks and city streets trees are grown mainly for purposes of shade and beauty, and as the coolest and most dense shade is given by the most beautiful trees, namely, those that are covered with leaves above, below and on all sides, it naturally follows that our city trees should be grown in this form. And there is but one way to grow them after this manner, and that is by giving them plenty of light, and keeping the trimming fiend at a distance.

In Victoria Park, young as it is, many trees are at this moment ugly and deformed by a want of observance of these conditions, light and trimming, and, in fact, one can see there some of the most striking examples of how not to grow a tree that can be found in a long journey. But it seems invidious to single out Victoria Park, when one can see in any part of the city glaring examples of distrust in the Creator's good taste and ability to grow a tree properly.

To many people who do their own pruning and do a good deal of it, the idea may not have occurred that nature really intended certain trees to grow in certain forms, and that no matter how they may be pruned, that form will always be the ultimate aim of the tree. They fail also to realize that the hand of God is omnipotent, and that their best endeavours will only mar the perfection of beauty into which a tree would come if permitted to follow its natural bent.

The love of trees is implanted deep in the nature of nearly every person. Many people do not realize this until they come into possession of a plot of ground, where a few trees are growing, when their natural affection comes quickly to the surface. But few, however, have this feeling so chastened with wisdom as to enable them to treat their trees well ; nearly all want to grow two, three or even a dozen trees in the space that shodld be given to one, not realizing how much better it would be to have one fine, large, well-shaped, handsome tree, than to have half a dozen stunted, mis-shapen, lopsided ones, whose only real utility is for consumption as fuel. No better proof of this deeply im-

planted love can be offered than the fact that it is almost impossible to persuade the average man to part with a single one of his trees, even when the destruction of one means the betterment of the others.

Occasionally, however, one sees a tree, even in London, that has had unlimited chance to develop, and the owners of these grand trees declare them to be without price; but these beautiful examples are all too few. The other extreme is everywhere, and perhaps the most flagrant case in London is in front of the Collegiate Institute. There stand three or four rows of trees, not one of which is now, or has any prospect of ever being anything but an eyesore, and yet those trees are old enough and have used enough nourishment from the soil and light from above to have made trees as handsome as any in the city had they been given proper opportunity. They are now so far gone that it would be almost impossible to make a really fine tree out of a single one of them ; and what has occurred here is in process of occurring all over where from two to ten trees are planted in the space which one large, well-grown tree will need in twenty-five years.

At irregular intervals a man, called by courtesy a "tree-pruner," more or less authorized by those who rule over us to butcher every inanimate object, travels through our streets and makes a bad matter still worse.

A gentleman living near my house had last summer a very handsome cut-leaved birch and a good many maples growing on his front lawn. Noticing that the birch was beginning to suffer from being overcrowded, I one day complimented him on the beauty of his tree, and suggested that it needed more room in order to retain its beauty. He replied that it was a very nice tree, but it needed pruning, and he was getting a man who understood such things to come and see to it. The beauty of this species of birch lies in the long, slender, drooping branchlets, and in the handsome pyramidal shape of the tree ; but this "pruner" sawed off the trunk of this tree at about eight feet from the top, sawed one-third off the larger limbs, and left the tree shorn of all its beauty and with the work of years destroyed. All the tree needed was to receive plenty of light and to be left alone. Such examples are abundant.

I notice lately that the tree pruner is getting in his deadly work at Springbank also. Within the past year or two the birches, poplars, maples, etc , near the pump-house have had from two to five feet taken off most of their branches, and from the trunk also. The object of this treatment is undiscoverable. The spruces, too, in other parts of the grounds, are receiving similar attention, and of all trees the spruce needs pruning least, and bears it worst. A pruned spruce is no longer a spruce, but an abortion, unlike anything in nature and is fit only for the brush pile, for it will never be itself again.

When trees are too many, cut some of them down. A tree which is too large for its environment can never be made handsome by any system of pruning, and not only that, it will spoil others which might be ornamental if its space were vacant.

Now, a word as to the planting of shade trees. In London we suffer from a superfluity of silver maple (Acer dasycarpum). This is a quick growing tree of handsome form, but there are others that are as quick growing and many that, though slow growers, are more desirable and very handsome. Our streets should not all be planted with one kind of tree. Monotony should be avoided. Besides, when a blighting disease or a devastating insect, affecting possibly only one species of tree, reaches a city planted with that tree only, that place is liable to have very few good trees left. Some twenty-five years ago the streets of London had many locust trees, whose foliage and flowers are both beautiful, but the locust borer came among them and now they are gone. The maple is a grand tree, hardy and nobly beautiful, but we have many other fine trees also, and doubtless it was never intended that we should confine ourselves to the use of one species only. The birches, three or four species of beautiful trees, immortalized in poetry and characteristic of the north ; the lofty elm, whose fame as a street tree in New England has spread over the entire continent ; the fragrant basswood, the evergreen spruces and cedar, the hemlock, which I sometimes think is the handsomest of all our trees, and the nut trees, chestnut, butternut, walnut, beech and the hickories—all these and many more have beauties of their own, and should be largely used, particularly the nut class, which render the parks attractive to the squirrels and the birds and the children, and is it not for the children, particularly those of the poorer people, for whose use the parks should mainly exist ? I have no patience with the park regulations which say to the children, "Keep off the Grass." Rather

let them say, "Boys and girls, this park is for you; don't destroy it, but enjoy it in every possible way." Some day I hope we shall see this principle recognized.

Beauty in the streets and parks is an asset, and should be well looked after, as it is perhaps the greatest attraction a city can have, next to a low tax rate; and although we have to-day many thousands of spoiled, ugly trees, fit only for the woodpile, yet there are thousands more growing up, and intelligent care can prevent most of them from following the example set by their elders.

These points upon which I have touched affect not only our own city, but almost every city and town in our country; and the need for intelligent care is urgent.

It was only a few weeks ago that an eminent horticulturist wrote in the pages of *Gardening*, a leading American magazine, of the folly of planting trees in rows along the drives in parks, a method which is the worst possible, for besides spoiling the artistic appearance of the place, it prevents the people on the drives from the realization and the enjoyment of the beauties of either the nearby or the distant view, and yet, despite of the fact that this principle is freely stated and admitted by the best authorities, it is the very method which is being adopted in our river park, now in process of formation; and not only that, but the chief part of the trees planted have been soft maples and Norway spruces, the very ones of which Londoners have already far too many. It is to be hoped that ere long different methods may prevail, and while there is yet time the best may be made of the material now planted, and that the future may be properly provided for by the planting of such trees as will lend variety and beauty to the landscape. How this is to be accomplished is not difficult to tell, for it can only be done by placing the control of such matters in the hands of men who have given thought and study to the subject. Were our own city council, for instance, to appoint for 1901 a committee consisting of a few such men, and to give them a free hand in the matter the effect on the appearance of our city parks and streets would be great and lasting.

I have not touched upon the matter of shrubs and flowering plants, but it would be easy to make a great improvement over present conditions were the plan above mentioned to come into action, and no plan would be complete that did not aim at the best results in these points, as well as others; but a shrub may be at its best in five or ten years, whereas a tree is the growth of decades, and neglect for ten years may ruin the result of twenty-five years' careful work and thought.

Dr. James Fletcher, Dominion Entomologist and Botanist, Experimental Farms, Ottawa, was the next speaker. His address was illustrated with beautiful lantern pictures, which gave great pleasure to the audience. The excellent lantern was kindly provided by Mr. Merchant, Principal of the Normal School, who was assisted in its manipulation by Mr. R. W. Rennie.

Dr. Fletcher first presented a series of pictures in illustration of the paper that had just been read by Mr. Saunders and showed how trees should be grown and treated, giving as examples specimens that were growing on the Experimental Farms at Ottawa and in the North-West. Many of these were from photographs taken on the grounds of the Experimental Farm at Ottawa, and had been specially lent for the occasion by Dr. William Saunders, the Director. Among others he exhibited the Black Walnut, Russian Poplar, Austrian Pine, Blue Spruce, Scotch Pine, Cutleafed Birch, and some very remarkable trees in the Rocky Mountains and in British Columbia; he also showed some beautiful flowering shrubs and other interesting plants, the Hydrangea paniculata grandiflora, Spiræa van Houtei, Mary Arnott Rose, Charles X Lilac, Cypripedium spectabile, etc.; the Devil's Club (a most troublesome plant to mountain climbers), Hedges on the North-West Experimental Farms, Dr. Saunders's Hybrids from Apple and Pyrus baccata; the method of spraying trees at Ottawa.

He then took up the subject of insects, showing how those that are injurious may be divided into two great classes according to the mode in which they partake of their food, namely the biting (those furnished with jaws) such as caterpillars, grubs, beetles, &c., and the sucking (those provided with a beak or sucker), such as mosquitoes, aphides, bugs, &c. The former can be destroyed by poisoning their food with such substances as Paris green, hellebore, insect-powder, &c., but the latter cannot be reached in this way, and must be subdued by substances that will smother them when applied to their bodies, viz., kerosene emulsion, whale-oil soap, &c. The many beneficial species of insects, such as lady-birds, ichneumons, carnivorous ground beetle, which prey upon cut-worms, and

many others, ought to be familiar to all, so that they should not be wantonly trodden under foot or otherwise destroyed. Excellent figures of all those referred to were shewn upon the screen, and a large number of our most prevalent insect pests, among others, the cabbage-root maggot, the devastating and climbing cut-worms, the May beetle (white grub), pea-weevil and pea-aphis, pear psylla, eye-spotted bud-moth, canker and palmer worms, the cigar case-bearer, plum sphinx and curculio, grape-vine flea beetle, spruce gall-louse, tent caterpillars, codling moth, San José scale, and the lovely Luna moth. Each picture as it appeared was briefly described in the speaker's well-known graphic and often humorous manner, and the interest and attention of the large audience were maintained to the last.

At the close of Dr. Fletcher's address, the following resolution was proposed by Dr. Bethune, who spoke briefly in its support, and seconded by Principal Kirk; on being put to the meeting, it was unanimously adopted:

"That this meeting of the Horticultural and Entomological Societies endorses the idea that the control of the city's horticulture should be in the hands of men who have made this science a study; and that this meeting urges upon the City Council the advisability of placing in the hands of a small committee of citizens the entire control of the shade trees on the streets and in the parks of London, believing that in this way only can the best results be accomplished; and that the secretaries of the two societies are hereby instructed to send copies of this resolution to the Mayor and the City Clerk early in January, 1901, asking that it be brought before the Council at the earliest possible moment, and requesting that action be taken thereon."

At the conclusion, votes of thanks were tendered to the ladies for the musical treat that they had afforded; Professor James and the other speakers for their interesting addresses; Professor Lochhead, for the loan of a number of slides; and Principal Merchant, for the use of the Lecture room and lantern, and the kind assistance that he and Mr. Rennie had afforded.

WEDNESDAY, NOVEMBER 14TH.

The Council of the Entomological Society met at 10.30 a.m., for the transaction of business and the preparation of their report on the proceedings of the past year. The President occupied the chair, and the meeting continued in session till one o'clock.

The Society met at 2.30 p.m. Among those present were the following: Rev. Dr. Fyles, South Quebec, President; Prof. Lochhead, Ontario Agricultural College, Vice-President; Dr. James Fletcher and Mr. Arthur Gibson, Experimental Farm, Ottawa; Mr. Henry H. Lyman, Montreal; Inspector G. E. Fisher, Freeman, Ont.; Prof. F. M. Webster, Wooster, Ohio; Revs. Provost Watkins, and Dr. Bethune, London; Drs. Woolverton and Stevenson, and Messrs. J. A. Balkwill, J. H. Bowman, J. Dearness, H. Gould, B. Green, C. J. Fox, W. Gammage, W. H. Hamilton, John Law, Heard, J. A. Moffat, S. B. McCready, W. E. Saunders, R. W. Rennie, E. A. Brown, H. S. Saunders, and many other residents of London.

The President called upon the Directors and Officers of the Society, the representatives of the Branches, and the chairmen of the Sections for their respective Reports on the work of the past year. These were read and discussed, as follows:

Report of the Council.

The Council of the Entomological Society of Ontario begs to present its Annual Report for the years 1899-1900.

The thirty-sixth annual meeting was held in London in October 1899, and was well attended by members from a distance as well as by those resident in the city. An interesting and important addition to the ordinary proceedings was a conference held during the first afternoon on the San José Scale and the operations that had been carried out for its suppression in the Province of Ontario. A full report of the discussion and of the subsequent proceedings at the meeting has already been published; it is therefore unnecessary to enter into particulars.

The thirtieth Annual Report on economic and general Entomology was presented to the Minister of Agriculture for Ontario in December last and was printed and distributed in the following March. It contained 127 pages and was illustrated with sixty-six wood cuts and two plates, one a portrait of Mr. Henry H. Lyman the retiring President, the other exhibiting the structure of a butterfly's wing. Besides the account of the conference on the San José Scale and the proceedings at the Annual Meeting, it contained among many useful papers, the President's address by Mr. Lyman; "One hundred years of American Entomology" and "The home of the San José Scale" by Prof. F. M. Webster; papers by Prof. Lochhead, Mr. Arthur Gibson, Mr. J. A. Moffat, Dr. Bethune, Mr. W. N. Hutt, Dr. Fyles, and articles on the most notable and injurious insects of the year by Dr. Fletcher, Messrs. Harrington, Evans, Moffat, Gibson and Drs. Fyles and Bethune. An addition of much interest was the report of the proceedings at the first annnal meeting of the North-West (Canada) Entomological Society, held at Lacombe, Alberta, in November 1899.

The *Canadian Entomologist* has been regularly issued at the beginning of each month. The 31st volume was completed in December last; it consisted of 377 pages, illustrated with 36 wood cuts and six plates. The contributors numbered no less than sixty, and included well-known writers in England, Germany, Finland, Brazil and Japan, as well as in the United States and Canada. The thirty-second volume will be completed next month; the eleven numbers already issued contain 352 pages and many original illustrations.

An index to the thirty Annual Reports of the Society, 1870 to 1899, has been prepared by the Rev. Dr. Bethune and is now being printed under the direction of the Department of Agriculture. It is expected to be ready for distribution before the end of the year, and will, undoubtedly, be found of very great value by all who have occasion to consult these Reports.

Entomological meetings have been held regularly on Friday evenings, at first fortnightly, afterwards weekly, from October to June, and have now been resumed for the autumn and winter seasons. The study of the Lepidoptera was taken up for several months and when spring opened specimens freshly captured were brought for identification and discussion. The order Coleoptera has been adopted for study during the sessions that have now begun.

The Council is glad to be able to report that the Ornithological Section has been revived and has held regular monthly meetings for a year past; at the same time it has to express its regret that no meetings of the Botanical Section have been held this year. The Geological Section has been as active as usual, holding weekly meetings on Tuesday evenings throughout the greater part of the year, and the Microscopical Section has held interesting meetings on alternate Friday evenings during the autumn and winter months.

Many valuable and interesting additions have been made to the Library and Collections. The Council desires to bear its testimony to the great care taken by Mr. Moffat in the preservation of the Society's books and specimens, and their neat and orderly arrangement. Too much praise cannot be accorded to him for the zeal and interest that he always displays in attending to the welfare of the Society and the good order of its property.

All of which is respectfully submitted.

THOMAS. W. FYLES, President.

REPORT OF THE LIBRARIAN AND CURATOR, FOR THE YEAR ENDING 31ST OF AUGUST, 1900.

Thirty bound volumes of Government Reports, and proceedings and transactions of societies were received during the year. Among them were twelve quarto volumes of the United States Geological Survey, profusely illustrated, with a volume of maps accompanying them.

Thirty-four volumes were bound and added to the library. Among these are some volumes of the Bulletins of the Iowa University (a gift to the library by Rev. Dr. Bethune) one of which is of special interest, being explorations in the Canadian Far North in search of the Musk Ox, by Frank Russell. Also contributions from Drs. Fletcher and Bethune of volumes of the Proceedings of the American Association for the Ad.

vancement of Science, which complete the Society's set up to date, and make the number of volumes added during the year 64.

The full number now on the register is 1,691.

Number of volumes issued to local members was 45.

A few additional specimens of Manitoba Lepidoptera have been secured since the last report, which are valuable for reference and comparison.

Nothing of special interest in local captures can be reported for the past season. A few doubtful forms are awaiting determination. Mr. O. C. Poling, of Quincy, Illinois, has kindly and considerately presented to the Society, a fine pair of that rare, singular and interesting butterfly, *Neophasia Terlootii*, Behr., taken in Arizona.

Respectfully submitted.

J. Alston Moffat.

Auditors' Report.

Receipts and Expenditures of the Entomological Society of Ontario, for the year ending August 31st, 1900:

Receipts.		Expenditures.	
Balance, September 1st, 1899	$ 576.30	Cork, pins, etc	$ 45.20
Sales of Entomologist	150.69	Expense acct.,(Postage, etc.)	159.79
Sales of Cork, pins, etc	93.58	Library	35.89
Advertising	14 35	Salaries	375.00
Government Grant	1,000.00	Annual Meeting and Report	254.60
Members fees	439 86	Rent	175 00
Interest	13.16	Printing	749 75
		Balance on hand Aug. 31st, 1900,	492.71
	$2,287.94		$2,287.94

We, the Auditors of the Entomological Society of Ontario hereby certify that we have examined the books and vouchers of the Treasurer and find them correct, and that the above is a true statement of the accounts of the society.

W. H. Hamilton }
Jas. H. Bowman } Auditors.

London, Ont., Sept. 18th, 1900.

REPORT OF THE MONTREAL BRANCH.

The 224th Regular and 27th Annual Meeting of the Montreal Branch of the Entomological Society of Ontario was held at 74 McTavish street on Tuesday evening, May 8th, 1900.

The members present comprised Messrs. A. F. Winn (Pres.), Henry H. Lyman, A. E. Norris, E. T. Chambers, J. C. Williams, G. Chagnon, G. Beaulieu, M. W. Davis, C. Stevenson, G. A. Moore, C. P. Newman and L. Gibb. Visitor—Rev. E. C. Trenholme.

The chair was taken by the President and the minutes of the previous meeting, and also of the last annual meeting, were read and confirmed.

Report of the Council.

The President then submitted the following report of the Council for the past year:

In presenting their report for the past year your Council is pleased to be able to state that much good work has been done.

Eight regular monthly meetings have been held, the average attendance being ten, and six new members have been added to our roll.

We have again had a visit from each of our good friends, Dr. Fletcher and Rev. Dr. Fyles, in addition we had the pleasure of having Mr. J. G. Jack of Jamaica Plains, Mass., at one meeting and one of our new members, Mr. E. D. Wintle of Como, P.Q., has come to our meetings regularly.

Two field days were held, the first at Beloeil Mountain, St. Hilaire, on May 24, which was very successful, many valuable specimens being secured; the other at Chateau-

guay on July 1st was made a most enjoyable outing, through the kind hospitality of Mr. and Mrs. Jack and their family, but the captures were disappointing owing to the strong wind which was blowing all day. Several members also attended the Natural History Society's field day at Montford.

The following papers were read at the meetings :

Retiring Address of the President—Henry H. Lyman.
Collecting at Electric Light—A. F. Winn.
Note on Emergence of Telea polyphemus—M. W. Davis.
The Genus Hydroecia—Dwight Brainerd.
Spiders—Rev. Dr. Fyles.
A Sketch of the Order Orthoptora—E. M. Walker (of the Toronto Branch).
Tribulations of a Beginner—Dwight Brainerd.
Practical Entomology, or Bee Keeping—Gilbert Wintle.
Bees and Wasps—Dr. Jas. Fletcher.
An Entomological Muddle—Henry H. Lyman.
Chrysophanus thoe—A. F. Winn.
On the Rearing of Lepidoptera—Arthur Gibson.
Danais Archippus—A. E. Norris.

This list probably shows more diversity of subjects than that of any year in the history of the Branch, and the specimens shown at the meetings have included orders that have been little studied here in the past, such as Diptera, Hymenoptera and Orthoptera.

Our collection of books has again been added to by Mr. J. G. Jack, who has presented copies of the report on the Gypsy Moth and two volumes of Memoirs of the Academy of Natural Sciences. A case has been ordered for our books and pamphlets, and the Natural History Society have kindly consented to give us space for it in their building.

The Treasurer's statement shows the Branch to be in a good financial position.

Respectfully submitted on behalf of the Council,

ALBERT F. WINN, President.

The Treasurer then submitted his report, showing a balance on hand of $59.37.

It was moved by Mr. H. H. Lyman and seconded by Mr. C. Stevenson "That the reports of the Council and of the Treasurer be received and adopted." Carried.

The following officers were elected for the ensuing year: President, A. F. Winn; Vice-President, Dwight Brainerd; Secretary, Lachlan Gibb; Treasurer, M. Waring Davis; Librarian, A. E. Norris; Council, H. H. Lyman and G. Chagnon.

Mr. Henry H. Lyman read a paper on the Life History of Euchaetes Oregonensis, and also exhibited a pamphlet entitled Memoirs of the Chicago Entomological Society.

A letter was read from E. Brunetti, London, England, asking for exchange in Canadian Diptera, which was referred to Mr. Chagnon.

After examining a number of specimens shown by the members the meeting adjourned.

LACHLAN GIBB, Secretary.

REPORT OF THE QUEBEC BRANCH.

The annual meeting of the Quebec branch of the Entomological Society of Ontario was held on May 12th, 1900, the president, Rev. Dr. Fyles, occuping the chair.

PRESIDENT'S ADDRESS.

The Quebec branch of the Entomological Society of Ontario has entered upon the fourth year of its existence. During the past year several things have happened to occasion our members much concern.

Death has removed two from amongst us. Mrs. Treffry departed this life a few months ago ; and on April 27th, Mr. Treffry after a very brief illness was also taken

away. We shall miss the active interest he took in our affairs. His ability as a journalist and his ready pen were often exercised in the interests of the Branch and his cheerful good-nature, before sorrow overtook him, added to the interest of our meetings.

Next we have to record the closing (temporary it is to be hoped) of Morrin College. The reduction of the grant from the Superior Education Fund, the inadequacy of the number of paying students to make up for this, and the failure of support from our decreasing English speaking population, militated seriously against its interests and made it impossible to maintain its very efficient staff of professors without trenching too far upon the capital funds of the Institution. We hope that the privilege of meeting in the College rooms will still be allowed us.

The late principal, Dr. Macrae, and Professors Clark, Gunn and MacIntyre took a kind interest in our proceedings; and in Professor Walters we have had a firm friend and valuable member. Should he be called from the city, we shall regret his departure deeply at the same time that we shall indulge the hope and heartily pray that health and prosperity may attend him and his family wherever their lot may be cast.

An untoward accident in the beginning of March interfered for two months with the regular course of the proceedings of the branch, but before that its meetings were regularly held and well attended.

Four field days were held in the course of the summer: two at the Gomin; one (by invitation) in the grounds of E. H. Wade, Esq., at New Liverpool and one at the Island of Orleans.

At the meetings in Morrin College, the following subjects were considered:—Noah's Flood and the Insect World: Ichneumon Flies; Dragon-Flies; "The Kissing Bug"; the Hemiptera; the Ceratocampidae and the Saturnians.

At one of the meetings a most interesting narrative of an entomological expedition to the country north of Brandon, Man., written by Mr. A. Hanham of Winnipeg, was read and fully appreciated. At another meeting many very beautiful southern moths presented to the president by Mr. H. H. Newcomb of Boston were exhibited and greatly admired.

Among the interesting captures of the season were: *Thyatira rectangulata*, Ottolengui, which was taken on the Island by Mrs. Turner; a fine specimen of the salmon-colored variety of *Hepialus argenteomaculatus*, Harris, taken at light at St. Paul, Quebec; *Catocala Bianca*, Hy. Edwards, also at light at Levis; and a very fresh specimen of *Ufeus Satyricus*, Grote, caught on the wing at the Chaudière, on the *20th of January* by Mr. Charles Barclay.

A new pest has made its appearance in this province viz: the American Cockroach (*Periplaneta Americana*) a specimen of which was found at St. Paul, Quebec, on the 21st of April. This makes the fourth kind of cockroach that has shown itself in Quebec Province. The other three are the German Cockroach (*Ectobia Germanica*); the Oriental (*Blatta orientalis*) and the Australian (*Periplaneta Australasia*). All these insects are troublesome and disgusting, but they are incapable of inflicting personal injury. A very effective trap for them may be purchased in the hardware stores. Rapid and constant intercourse with all parts of the continent will doubtless bring many insects within our borders.

By far the worst pest that of late years has shewn itself in Canada is the San José Scale. Up to the present time it has not been found in the Province of Quebec; but in Ontario its ravages have occasioned much dismay. Fortunately the Ontario Government are aware of its dangerous character and are taking timely and stringent measures to check its course. The report of a very interesting discussion upon this scale is printed in the Society's Annual Report which will shortly be in the hands of the members.

It is to be hoped that the coming season will be a favorable one from an entomological point of view; that no troublesome insects may increase to cause alarm and that many rare and beautiful specimens may reward the efforts of our collectors.

Report of Council.

The branch now includes 43 members: 33 adults and 10 juniors.
The Treasurer's report gives a very satisfactory showing.
Several excursions were made during the year and were very successful.

Owing to an accident to our worthy president the course of lectures had unfortunately to be interrupted to the great regret of the members.

Our thanks are due to the authorities of Morrin College for having continued to allow us to use their rooms for our meetings.

H. Walters, on behalf of the Council.

It was moved by Miss Hamel, seconded by Mrs. Poston, and unanimously resolved that the thanks of the meeting be tendered the council and the officers.

The following were then elected :

President, the Rev. Dr. Fyles.

Vice-President, Miss E. MacDonald.

Council, Mrs. R. Turner, Mr. James Geggie, Professor Walters, Hon. R. Turner, Miss Bickell, Miss Winfield.

Secretary-Treasurer, Lt.-Col. Crawford Lindsay.

Curator, Prof. Walters.

Since the above report was written Morrin College has been re-opened, and has a large attendance of students. The Quebec Branch of the Entomological Society of Ontario has commenced its regular work and is in a very healthy condition. At the last meeting twenty-two members were present and four new members were elected. Before the close of the season it held a happy field-day in the grounds of James Geggie, Esq., at Darnoc, Quebec.

Thomas W. Fyles,
President of the Quebec Branch.

REPORT OF THE TORONTO BRANCH.

The fourth annual meeting of the Toronto Branch of the Entomological Society of Ontario was held in the Education Department (Normal School), on Friday evening, the 6th April, 1900.

The following members were present : Messrs. E. M. Walker (Vice-President), G. M. Stewart (Secretary-Treasurer), H. C. Austin (Librarian), D. G. Cox, R. J. Crew, C. H. Tyers and S. R. Carter ; visitor, Mr. A. Cook.

In the absence of the President, the Vice President took the chair.

The minutes of the previous regular meeting were read and approved.

Messrs. Geo Smith, Geo. Rossiter, Albert Cook and W. H. Harrison were duly elected members of the Branch.

The Secretary read the following report of the Council for the year ending 31st March, 1900 :

Report of Council.

The Council of the Toronto Branch of the Entomological Society of Ontario take much pleasure in presenting the Fourth Annual Report of the proceedings of the Branch for the year ending 31st March, 1900.

They are pleased to report that since the last annual meeting the membership of the Branch has been increased by the addition of one new name, viz , Mr. D. G. Cox, and as some of the meetings have been attended by visitors, no doubt others may be induced to take an interest in our work in the near future.

During the past year fifteen regular meetings have been held in the Education Department, with a fair average attendance of the members. The Council is pleased at the result of Mr. Lyman's suggestion that papers be exchanged between the Toronto and Montreal Branches, and is much indebted to the members of the latter Branch for the interesting papers so kindly contributed. As a partial return, Mr. Walker's paper, mentioned below, was forwarded to be read before the Montreal Branch.

The following is a list of the papers read before the Branch during the past year :

Annual Address of the President, Mr. R. J. Crew.

Notes on Danais Archippus, Mr. H. H. Lyman, of the Montreal Branch.

A Sketch of the Order Orthoptera, with special reference to the Ontario Forms, Mr. E. M. Walker.

Collecting at Electric Light, Mr. A. F. Winn, President of the Montreal Branch.

The Rearing of Lepidoptera, Mr. Arthur Gibson.

Notes on the Anatomy of Belostoma, Mr. G. M. Stewart.

An interesting feature of the year's work was an open meeting held on the 5th of January, at which a large audience was present, including many Normal School students. Dr. Fletcher, of Ottawa, Dominion Entomologist, gave a most interesting lecture on "Bees and Wasps." Dr. Bethune, of London, editor of the *Canadian Entomologist*, also gave an interesting address on the aims of entomology, and spoke of the work being done by the Entomological Society of Ontario and its Branches.

During the year several field days were held and many interesting captures were made.

The work of classifying the collection of insects made by the Branch for the Education Department is progressing well, and it is gratifying to know that the species already collected and donated have been transferred into the cases, in the Department. During the coming season the Council would urge the members to collect largely so that by next winter the Department may be in possession of a fairly good reference collection of the insects of Ontario.

The report of the Librarian shows that many valuable Government publications have been added to the library, also that two periodicals have been subscribed for, and several books purchased during the year.

The Treasurer's report shows a small balance carried forward on the right side.

Respectfully submitted on behalf of the Council.

ARTHUR GIBSON,
President.

The report of the Treasurer was then presented, as was also that of Mr. Austen, as Librarian, and on motion the reports of the Council, Treasurer and Librarian were duly adopted as read.

The election of officers for the ensuing year resulted as follows: President, Mr. D. G. Cox; Vice-President, Mr. E. M. Walker; Secretary-Treasurer, Mr. G. M. Stewart; Librarian, Mr. H. C. Austen; Members of Council, Messrs. R. J. Crew and C. N. Tyers.

The address of the retiring President, Mr. Arthur Gibson, was read by Mr. Walker, Mr. Gibson, owing to his duties as assistant in the Division of Entomology at the Central Experimental Farm, Ottawa, being unable to be present. The work of the Branch since its inception was reviewed, particular attention being made of the year just ended. The members were urged to make extra efforts the coming summer to collect and mount specimens for the collection which the Branch is forming for the Educational Department for Ontario. The latter portion of the address took the form of a practical illustrated paper on "The Preservation of Larvæ by Inflation."

A vote of thanks to Mr. Gibson for his interesting address was carried.

The meeting then adjourned.

G. M. STEWART,
Secretary.

REPORT OF THE MICROSCOPICAL SECTION.

A meeting for the organization of the Section was held on November 4th, 1899, and the following officers were elected for the ensuing year: W. E. Saunders, Chairman; S. B. McCready, Secretary; J. A. Balkwill, J. Dearness and J. H. Bowman, Committee.

During the season eleven meetings were held, with an average attendance of seven, besides occasional visitors. At each meeting interesting subjects were discussed and the objects referred to examined under the microscope; five papers were read, viz.:

The Protoplasmic Cell—J. H. Bowman.

The Multiplication of Cells—J. Dearness.

The Protoplasmic Cell—J. Dearness.

Micrometry—J. H. Bowman.

The Natural History of Florida—W. E. Saunders.

One meeting was given over to the examination of freshly collected living organisms, two to the examination of exceedingly beautiful chemical crystals, prepared on the spot by Mr. Bowman, and one to the discussion of fermentation.

At the fourth meeting Mr. Thos. Beall, of Lindsay, brought before the members the desirability of forming a Horticultural Society in London. The project was highly approved of and energetically taken up, resulting in the formation of the very successful and enterprising London Horticultural Society.

W. E. Saunders,
Chairman.

REPORT OF THE ORNITHOLOGICAL SECTION.

The reorganization meeting of the Ornithological Section of the Entomological Society was held on January 13th, 1900. Officers were elected and an outline of plans was made for the season. Monthly meetings were adopted, omitting July and August. This programme has been strictly adhered to. Nine meetings have been held, at which the average attendance has been five, and ten papers have been read, entitled as follows :

"New Birds for Middlesex and Ontario," W. E. Saunders; enumerating six species new to Ontario and eight species new to Middlesex County, all taken since the last meeting in 1894.

"An Ornithological Incursion into Florida," W. E. Saunders.

"The Sparrows of Ontario," J. E. Keays; enumerating the generic and specific peculiarities of each species, with notes on their habits, fully illustrated by specimens.

"The Cubic Contents of the Eggs of the Common Buteos," J. E. Keays.

"The Nesting of the Sharp Shinned Hawk," H. Gould.

"The Flycatchers of Ontario," W. E. Saunders.

"The Grebes and Loons of Ontario," W. E. Saunders.

"A Trip to Point Pelee," H. Gould; illustrated by specimens.

"A New Song for a Common Bird," W. E. Saunders.

"Seasonable Changes in the Food of Sparrows," J. E. Keays.

Two of the above-named papers have been published and others will be in the near future. Besides these, short notes on interesting subjects have been presented, one recording the capture of two specimens of the Long-tailed Jaeger, at Rondeau,—the first for Ontario.

The spring arrivals have also been closely recorded, 144 species being noted by members up to May 26th. Dates of the fall migrations are also being prepared and are now about complete.

A number of fine sets of eggs have been taken by the members, the best of which were six sets of the Sharp Shinned Hawk, and five sets of the Cerulean Warbler. An account of the work done on this bird was published in *The Auk* for October.

Bird protection in London was also taken up, and notices published in the papers that wanton destroyers of our native birds in the parks would be prosecuted, which notice accomplished the cessation of some shooting which had previously been going on.

All the choice new material taken by the members has been exhibited by them at the meetings, which have been interesting and enthusiastic.

J. E. Keays,
Chairman.
W. E. Saunders,
Secretary.

REPORT OF THE GEOLOGICAL SECTION.

The Geological Section of the Entomological Society of Ontario begs leave to present its annual report as follows :

The section with Dr. Wolverton as chairman continued its meetings weekly as usual, with but a short holiday, throughout the year. The interest in Geological study

was well maintained. The Huronian rocks with many of their characteristic minerals formed the principal study, while local fossils and minerals of the Devonian period received due attention. Visits for the purpose of securing specimens were made to interesting localities in Ontario and Michigan, by members of the Section and our table was frequently well supplied with the essentials of this department of Nature Study.

The Society mourns the loss of one of its charter members, Mr. Thos. Green, who passed away at the ripe age of eighty-seven years. His brother, who is over eighty years of age, is still a member of our Section. Until a short time before his death, Mr. Thos. Green was an energetic student of Nature, and materially added to the profit of our meetings.

The Chairman reported as follows: "I have made a special trip to Manitoulin Island and the Georgian Bay District for the purpose of obtaining characteristic fossils and minerals of these regions, as a basis for the study of the Huronian formation during the winter. I travelled in all by water 450 miles, and secured a great variety of vein matter consisting of quartz, mica, plumbago, feldspar, molybdenite, bornite and other copper ores, as well as many specimens of corals.

Manitoulin Island abounds in fossil coral, and good specimens were obtained, as you may see from the collection before you. We will make a detailed study of these during the ensuing year."

Our Chairman and Mayor Rumball of this city, also visited a farm in West Nissouri township to inspect the remains of what was one of Earth's most mighty creatures. During the Western Fair this year there were exhibited about thirty bones of gigantic size supposed to be those of a Mastodon or some closely related species of that class. Owing to the absence of teeth and most of the bones of the head, it has not been identified so far. These bones were uncovered recently by some men while excavating a drain through a peat bed, and are in a good state of preservation. The tusk measures more than nine feet in length. It is curved like a cow's horn and tapers to a point. The corrugations on the tusk where it entered the head are easily discernible. The femur is three feet in length and where it entered the socket, it is three feet in circumference. The tibia and fibula are well preserved and the foot bones are entire. Four ribs of large size are made to articulate with the vertebræ by ball and socket joints, attesting the great antiquity of the fossil.

From the position in which the bones were found, it would appear, that the giant becoming mired in the bog fell over and lodged probably against some partially submerged log and strangled. From a careful inspection of the locality where the bones were found our Chairman thinks other parts of the skeleton may yet be discovered, as no thorough search has yet been made. It is hoped by many citizens, as well as by the members of our Section, that London may be the final resting place of these interesting remains.

Efforts are now being made to establish a public museum in the city in connection with the Free Library. The question has been mooted in the press, and was thoroughly discussed at a meeting of the Library Board, and there is reason to hope that this treasure will not be allowed to leave our district.

In connection with the museum, Dr. Wolverton and other citizens have offered to loan valuable collections for a term of years and as only a small expense would have to be incurred in fitting up the rooms in the library building, there would appear no sufficient reason why we should not have this important means of education secured to us.

Our correspondent, Rev. Dr. Philp, of Petrolea, sent us two very interesting accounts of trips he made to points in Lambton County. The first was to a point near Shetland on the Sydenham about eight miles north of Bothwell, to inspect the shale beds which he found exposed there for some distance along the river bed. They belong to the Portage Chemung group. The shale is very dark, almost black, bituminous and filled with nodules of iron pyrites. These shales are beautifully stratified and "we were compelled," he says, "to think of ice sawn for storage." The shale in every respect resembled that at Kettle Point. Fragments of very large concretions (Kettles) were discovered, hemispherical in shape, the tops apparently cut off by the ice when the water was about sixteen inches higher than at present. We also found in the vicinity several kettles firmly embedded in the shale, each of them five feet in diameter.

A little further north we came upon two outcrops of limestone each about seventy feet in length; one runs parallel with the river and the other at right angles. On each side of these outcrops kettles are ranged. These vary in size and shape. They are from one-half to two thirds of complete globes. Crevices in the limestone are filled with material of the same composition as the concretions. Though we searched diligently for impressions of calamites we did not succeed in finding any at this place.

At a place three miles up the Sydenham from Shetland the Lambton limestones are exposed. They are very fossiliferous and are crowded with Spirifera Mucronata.

The Rev. Jos. Philp also visited the Enniskillen gum beds and reported to us his findings, and sent a fine specimen of what he terms mineral Caoutchouc. It was obtained from lot 16, second con., Enniskillen, near Oil Springs.

The bed is situated on the surface, and is quite extensive, though much of it has been removed and used as fuel for steam raising. With a fan blast it burns well. In appearance it resembles tar. It is almost jet black, dense and solid, somewhat resembling asphalt. People select the cleaner parts and use it as chewing gum. They say it is better than it looks. It is probably of the same origin as the petroleum found in the same vicinity.

Mr. Philp also examined the bituminous shales of Alvinston which are exposed at that point for nearly a mile along the river. They belong to the Portage Chemung group. He found one impression of a Calamite, very distinct. The stratification and the cleavage are noteworthy and the nodules of iron pyrites are very beautiful. At this point there is no trace of a kettle. He thinks the kettles are found only in the lowest portion of this formation. At least that is the case at Shetland, where the older strata are exposed.

The Lake Superior Copper Mines.

Mr. Goodburne, who visited the Lake Superior copper mines in October, 1899, read a paper descriptive of that region, opening with a brief description of copper and its ores. The first record of the discovery of copper in the Keeweenaw Peninsula, Michigan, was in 1636, and from that date its history was traced down to the present day. Mining, however, dates only from 1831, when Dr. Douglass Houghton, while a member of the Schoolcraft expedition, first made known the great wealth of the peninsula, and in 1834, the government first opened up the country to mining. From a review of the history of early mining, Mr. Goodburne proceeded to a description of the principal mines, chief interest centering in the great Calumet and Hecla, which yields 100,000,000 pounds of refined copper annually from the conglomerate lode underlying 20 acres of surface, a product valued at $18,000,000, taken from under land, which originally cost $1.25 per acre, or $25.00 for the most valuable copper mine in the world.

The great Keeweenawan formation consists of a series of eruptive beds, alternating in the upper division with sandstone and conglomerates, the whole lying above the Huronian slates, schists and metamorphic rocks The formation was, probably, originally horizontal at the bottom of the ancient sea. The system to the east is the Medina division of the Silurian formation, a time when great volcanic forces disturbed the earth; but it was probably the subsequent movements of the crust which tilted the beds so as to form a great trough or synclinal. The eastern edge is on the end of Keeweenaw Point, and the western across the Minnesota border. Michipicoten Island and the Nepigon district are on the reverse, or northern, fold of the synclinal, for while the Michigan edge dips toward the northwest, the northern edge dips in the opposite direction, but it is very much broken by depressions, and not so easily traced as the southern edge. The lower beds of the Keeweenawan formation consist mainly of a series of coarse crystalline gabbros, from 20 to 50 feet thick. There are 4,000 or 5,000 feet of these lava flows, after which the eruptions became somewhat different in chemical character, and more frequent, with thinner flows. These flows contain the copper. The lava is generally basic, like basalt, but acid and intermediate types are present. Among the typical kinds may be mentioned gabbro, diabase and melaphyr, including the amygdaloidal examples of the two latter, in which is the copper. Other rocks are the acid lavas, including felsites and porphyries, which have furnished much of the detritus for the sandstones and conglomerates, and these acid lavas, which do not flow as far or so freely as the basic, quite often trend across the other rocks in the form of dikes or bosses, with dome-like summits.

The copper occurs in the trap formation, which cuts the centre of the peninsula, and continues its course southward through Ontonagon county, extending westward through Wisconsin, to the western shore of Lake Superior, thence northward to Isle Royal, where it disappears on the mainland, appearing again in the Nepigon district. In all these places the geological characteristics are the same, thin sections of rock from one district being scarce distinguishable from a specimen taken from another. Eastward, the copper is found on Michipicoten Island, and the formation is traceable at Gros Cap, a few miles from Sault Ste. Marie.

The copper is not an ore, but is the virgin metal, all the paying mines being opened on lodes which carry native copper. There are a few fissure veins in Keeweenaw County (on the north of the peninsula), which carry grey sulphurets producing as high as 25 per cent. refined copper. All the mines produce considerable amounts of native silver, and the Quincy Company reduces its mineral by electrolysis in order to save the silver, which averages 38 ounces to the ton of copper.

When the lava flows rested under the ancient sea, the interstices in the frothy portion were filled with copper by electro-chemical action, forming the amygdaloidal rocks. The conglomerates are ancient sea beds, formed of boulders, sand and gravel, broken from the surrounding rocks of the ancient sea. These also had interstices, and were filled with copper in the same manner.

That the copper was carried in solution and arrested in its present position by some precipitating agent is conceded by most authorities; and that it was intimately associated with the melaphyrs that have had their ferrous iron changed into a ferric state by taking up more oxygen, has given rise to the now widely accepted theory that in the peroxydation of the ferrous iron is to be found the agent of precipitation. The origin of the copper is not so easily explained. One theory is that the copper was brought to the surface by the lava flows; another that it was deposited in a sulphuretted form, along with the detrital rocks of the period.

Mr. Goodburne illustrated his paper with diagrams of the district, showing the synclinal, and the position of the mines; and exhibited many beautiful specimens of copper and silver, from the form in which it was mined, until the copper was gathered from the great stamp mills.

We offer a suggestion to the other sections of our Entomological Society.

As it is difficult to secure members to replace those lost owing to removals, deaths and other causes, we would suggest occasional public meetings under the auspices of the parent society at which there should be a programme of addresses on subjects relating to nature study illustrated where practicable by views. These public meetings would advertise our society and would tend to increase both the interest and profit of the meetings.

G. KIRK,
Sec. *pro tem.*

REPORT FROM THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA,

Through the Rev. C. J. S. Bethune, D.C.L., Delegate.

During the year that has gone by since our last report to the Royal Society, the Entomological Society of Ontario has pursued the even tenor of its way and continued its useful and scientific work. There are no striking events to record, but much has been done of permanent value and additions have been made to the general store of the knowledge of insects and their ways.

The thirty-sixth annual meeting of the Society was held in October last at its headquarters in London and was especially noteworthy for the conference that was held on the important subject of the San José scale. Those who took the principal part in it were Prof. James, Deputy Minister of Agriculture for Ontario; Dr. Fletcher, Entomologist and Botanist of the Experimental Farms of the Dominion; Mr. J. Dearness, one of the special commissioners appointed by the Ontario Government to investigate the

ravages of the scale in this Province; Mr. G E. Fisher, Official Inspector; Professor Lochhead of the Ontario Agricultural College at Guelph, and Professor Webster of the Ohio State Agricultural Experiment Station. The proceedings at the Conference are published in full in the 30th Annual Report of the Society, which was presented to the Legislature of Ontario at the opening of its last session.

The Report also contains a number of valuable and interesting papers and is illustrated with sixty-six wood-cuts, many of them drawn specially for the purpose, a portrait of Mr. Henry H. Lyman, the retiring President, and a plate representing the structure of a butterfly's wing. Among the papers may be mentioned the following: "The President's Annual Address," by Mr. Henry H. Lyman, Montreal, in which the formation of an entomological union for the authoritative settlement of questions of nomenclature especially, was strongly advocated; an account was given of the importance of accurate descriptions of larvæ and the difficulties to be surmounted in making them; a short review was made of the principal work of the year in both economic and systematic entomology, and some account of recent publications was given. "One Hundred Years of American Entomology," "The Native Home of the San José Scale," and "Some Notes on the Larval Habits of the Gray Hair-Streak Butterfly," by Prof. F. M. Webster. "Notes on some Insects on Coniferous Shade Trees," "Injurious Insects of the Orchard, Garden and Farm in 1899," "Nature Study Lessons on the Cabbage Butterfly," by Prof. W. Lochhead, Guelph. "Spiders," by the Rev. Dr. Fyles, South Quebec. "The Wing Structure of a Butterfly," and "Remarks upon some Cuban Insects," by Mr. J. Alston Moffat, London. "Fatal Bite of an Insect," and "Some Observations of a Bumble bees' Nest," by Rev. Dr. Bethune, London. "Injurious Insects in Ontario During 1899," by Dr. Fletcher, Ottawa. "The Electric Light as an Attraction to Moths," by Mr. A. Gibson, Ottawa. "Asparagus Beetles," by Mr. W. N. Hutt, Southend.

The volume contains the reports on the work of the preceding year by the different officers of the Society, the Geological and Microscopical Sections at London, and the flourishing branches in Montreal, Quebec and Toronto. There are also valuable "Notes on the Insects of the Year," by the Directors, Messrs. Harrington, Evans and Gibson, in their respective territorial divisions, and by Messrs. Moffatt, Bethune and Fyles on the season of 1899.

The report concludes with an account of the first annual meeting held at Lacombe, Alberta, in November last, of the new and vigorous North-West (Canada) Entomological Society, which is fortunate in having Mr. Percy B. Gregson, of Waghorn, as its energetic President. The report of its council, the President's address, and papers by Dr. Bethune on "The use of Entomology;" Dr. Henry George on "The Pocket Gopher," and an address by Mr. Henry H. Lyman, are published in full.

The librarian states that the library of the Society now contains 1,627 bound volumes, besides a large number of pamphlets and periodicals. The chief additions to the cabinets of insects have come from Manitoba and Cuba.

Four distinguished entomologists were elected honorary members of the Society, viz: Dr. L. O. Howard, United States Entomologist, Washington, D. C.; Professor John B. Smith, Sc.D., Rutgers College, New Brunswick, N. J.; Professor F. M. Webster, Wooster, Ohio; and Professor H. F. Wickham, M.A., Iowa City, Iowa.

The Society has continued to publish its monthly magazine, "The Canadian Entomologist," which was begun in 1868, and of which the thirty second volume is now being issued. The thirty-first volume was completed in December last and consisted of 380 pages illustrated with six photo-gravure plates and thirty-six wood-cuts; thirty new genera of insects are described and ninety-two new species The contributors number sixty, of whom sixteen are residents in various parts of the Dominion, thirty-nine in the United States, and one each in England, Germany, Finland, Brazil and Japan. Among the large number of important papers may be mentioned the descriptions of Coccidæ from both North and South America by Professors Cockerell and Tinsley, and Messrs. Ehrhorn, Parrott, King, Hempel (Brazil) and Marlatt.

Papers on Classification: The Entomophilous Wasps by W. H. Ashmead; Dragon Flies by Jas. G. Needham; North American Myrmelionidæ by N. Banks; Coccidæ by Prof. T. D. A. Cockerell; Bees by Chas. Robertson; Wasps by S. N. Dunning; descriptions of new species: Lepidoptera by Prof. J. B. Smith, Dr. H. Skinner and Dr. H. G. Dyar; Orthoptera by Dr. Samuel H. Scudder and Jerome McNeill; Hymenoptera by

Carroll Fowler and W. H. Harrington; Diptera by D. W. Coquillett; Neuroptera by Rolla Currie; and Hemiptera by A. L. Quaintance and Otto Heidemann.

A list of Manitoba Moths by A. W. Hanham; the Coleoptera of Canada by H. F. Wickham; Ontario Acrididæ by E. M. Walker; Canadian Lepidoptera by J. A. Moffat, T. W. Fyles and E. F. Heath.

Papers of an Economic character by Enzio Reuter (Finland), M. Matsumura (Japan), F. M. Webster, R. H. Pettit, W. Lochhead, E. A. Carew-Gibson, and others.

From the foregoing list, which does not include short notes, book notices and other items of interest, it will be seen that the magazine covers the whole field of systematic entomology and contains articles of importance by well-known authorities on most of the orders of insects. It has become so necessary to the working Entomologist that there is a constant demand for complete sets of the volumes from the beginning and the Society has in consequence been obliged to reprint several of the earlier numbers.

SAN JOSÉ SCALE DISCUSSION.

At the request of the President, Mr. G. E. Fisher, of Freeman, Ont., the Provincial San José Scale Inspector, stated that he was present by direction of the Ontario Department of Agriculture, and was willing to give any information at his disposal with regard to the prevalence of the San José scale in the Province, and the work which had been done during the past season. He regretted to say that the state of affairs was not as favourable as he could wish, and that the scale was now known to be present in many districts where it had not been discovered last year. Many experiments had been tried by instruction of the Department to see if a practical remedy could be discovered to control the insect instead of the drastic measure of cutting down the trees. He was glad of the opportunity to let the members of the Entomological Society know what the general trend of his experiments had been. To begin with he would make the statement that the infestation of Ontario orchards by the San José scale was a far more serious matter than fruit growers of the Province yet realized.

The following is a condensed summary of Mr. Fisher's address:

A great deal was said at the last annual meeting of the Society about the value of whale-oil soap as the best remedy for the San José scale, and particular mention was made of the satisfactory condition of orchards now standing on Catawba Island, which had formerly been badly infested by the scale. I therefore took great pains during the past summer and carried out many careful experiments with this material, using the strength recommended as the best, namely, 2 lbs. of whale-oil soap to one gallon of warm water, as well as other quantities. When a tree was known to be infested it was treated thoroughly with 2 lbs. to the gallon, and all trees in the immediate neighbourhood were also sprayed with a solution of 1½ lbs. to the gallon. On other trees kerosene emulsion or crude petroleum were used, and careful notes taken of their effects upon the tree and the scale. With regard to the soap, the results were rather disappointing. In no case was the scale entirely eradicated, even when the soap was applied with the greatest care, according to the formula. Some trees where the full strength of 2 lbs. to the gallon was used are still infested, and the infestation is of about the same extent as at the beginning of the season. The scale was certainly reduced on cherry trees, and it was noticed that the soap had an excellent effect in clearing these trees of aphids. The treatment was applied just at the time the buds were bursting, when most people would think it was too late to use it without doing injury to the trees. But I found that no harm was done even when many of the blossoms were open. As a rule there is too much blossom on trees, and if some of this is destroyed it is an actual advantage, therefore this late spraying may be very beneficial. We have noticed that the young scales will move out on to a part of the tree which had been sprayed in the spring with the soap mixture, and will settle there and multiply. On the 18th August last I made an application, at Niagara, on a very badly infested tree, one, in fact, which was entirely covered by a moving mass of young crawling scale insects, walking all over the tree trying to find a place to settle. The soap was applied to the tree with a whitewash brush, with the object of finding out how reliable the soap was, and a little later a second application was made. I examined the tree again about the middle of November, and I think I had the nicest example of

the multiplication of the scale that could be found. The soap had killed the scale in the first place, of course, but the tree was just now in the same condition as when it was first applied, and the scales were multiplying on the part which had been washed with the soap. Below the untreated portion and for probably a foot and a half down over the part which was washed with soap, the larvæ were coming down in great numbers and there were actually mature females giving birth to young. This shews that washing with soap will not deter the scale insects from settling there and starting new colonies. In the middle of September I took my knife and scraped off the scales from a space one inch by two, clearing the bark entirely, and in two days this space was again entirely covered so that no bark could be seen. In the middle of October the same experiment was tried and the only difference was that it took twice as long for the space to be occupied again by the scales.

Kerosene also has been somewhat unsatisfactory. Trees have been killed and the scale does not seem to have been cleaned up. Crude petroleum has I think on the whole given the greatest satisfaction. Where it was applied on apple trees I have seen no bad results. I applied crude petroleum in one orchard to about 40 apple trees and 100 plum trees without in any way injuring a single tree. This was done about the middle of May. The trees were entirely freed from the scale and all that had been alive during the winter previous were cleared off. Case-bearers and many other insects were also destroyed. The material used was a mixture of 25 to 30 per cent crude petroleum with water, and applied as a spray. I am of the opinion that a mixture of half the quantity of soap recommended and half of crude oil in a combination pump would be preferable to either used alone. The crude petroleum will kill the scale insects but if applied in considerable quantities is apt to injure the peach and other tender trees. Great care should be exercised in applying it as advised. The soap alone is not a strong enough application, it does not kill enough of the scales. I do not think it would be safe to recommend crude petroleum for general use. People did not use whale oil soap in accordance with instructions given and the chances are they would not follow instructions when using crude oil, and thus trees would be killed. Judging from the experience of the past year I think some of the reported cases of injury by crude petroleum may be due to the way in which the substance has been applied. It must be borne in mind that no portion of the tree should be covered more than once by the spray or the oil will accumulate from each spraying until there is sufficient to injure the tree. I notice frequently when people are spraying that they begin on the trunk then spray the branches and when finishing bring the nozzle down again on to the trunk thus giving that part of the tree a double dose of the oil. This carelessness I think is the cause of much of the injury reported. The way that we spray is as follows: The pump is placed on an ordinary stone boat, one man sprays in one direction and one in another, and each tree is sprayed from four standpoints, or in other words as it is approached and as it is left behind in passing down the rows on each side of it. There is one part of the tree which is frequently overlooked when spraying, that is the upper side of the limbs on the opposite side of the tree to that which is being treated. This can only be reached by pushing the nozzle into the head of the tree and spraying over to the opposite side. (Mr. Fisher here passed around the meeting, specimens of infested wood, which had been cut from trees which had not been treated at all, and others from those treated with 2 lbs. of whale oil soap to the gallon or which had been sprayed with a 30 per cent mixture of crude petroleum. It was noticed that all these had some living scales on them.) In summing up the matter of remedial treatment I think the best results will follow if work is done in the month of April both with whale oil soap and petroleum applications. A perfect remedy should remain fresh for a long time, it must penetrate easily and must of course destroy the scales without injuring the tree. Soaps made entirely with potash are the best—soda makes a hard soap which solidifies on the trees. I have never seen an apple tree which was in any way injured with crude petroleum applied of the strength I have mentioned. The whale oil soap from Catawba Island has done the best work and it was only in the case where this Ohio soap had been used that the infestation did not increase. In the case of the other soaps tried the infestation has increased beyond what it was last spring. Many people did not know of the presence of the San José Scale in their orchards until they found it on the fruit. Almost the whole of the Niagara district is now infested with the scale and it is also very prevalent in the Guilds section where

little has been done to check it. The San Jose Scale has spread much during the past season and it is now abundant where it was hardly noticeable last year. It seems to me as if this scale question is going to develop into a great national calamity, and the time will come I fear when our grandchildren may have to tell their children of the good old times in Ontario when people used to be able to grow apples and other fruits.

With regard to the work of the scale it was formerly claimed that the fruit of the peach would not be injured on account of the fuzzy down upon its surface, but during the past summer I have seen peaches so covered with scales as to have the appearance of red apples, from the discoloration due to the injurious presence of the insect.——

Mr. Fisher here gave a review of the history of the San José Scale in Ontario and the excellent work that had been done by the Government in fighting it and protecting the fruit growers from loss. He was glad to find that public opinion was changing rapidly with regard to the work that was being done. He said "at Niagara, particularly, everybody is realizing that a very great danger threatens them and that something must be done or their interests will be destroyed. The fruit interests in Ontario are very great. One gentleman in St. Catharines sold $10,000 worth of peaches in 1899 and another at Niagara sold over $4,000 worth this year, and these peaches do not by any means represent their whole crop of fruit, as there are plums, cherries, pears, apples and small fruits beside. Some years of experience have taught us that when once we discover the San José Scale in an orchard no idea can be formed without close examination as to the extent of the infestation. In 1899 one orchard was examined carefully and 87 trees were marked—about the middle of this summer I visited this orchard and traversed it from one corner to the other, and I found the scale on every single tree I examined, and moreover on the very first twig I took hold of in every case. A good deal has been said about the rate at which scales can travel, and I am sure that this has been underrated. I have watched them a great many times and find that the young larvae can travel an inch in a quarter of an hour so that in a week they could travel half way across an orchard, and if blown to the ground I am quite sure they are capable of getting back again on to the tree. In addition to this there is no doubt they will crawl on to everything that moves and by that means will be carried in every direction. The increase of the scale is very rapid indeed towards the end of the season, especially during the month of September. Notwithstanding all that I have said, and remembering the state of affairs on Catawba Island, it would seem that if an orchard is treated conscientiously and regularly the scale will not exist in sufficient numbers to materially mar the crop of fruit. This is particularly true of the early varieties, which are practically developed before the season of the greatest increase of the scale. I may mention that during the past season I have noticed a very large number of the little black lady-bird beetles (Pentilia misella) which have done such good work in feeding on the scale.

Dr. Fletcher congratulated the Society on having Mr. Fisher present at the meeting. His excellent and careful work on the San José Scale was well known. He was somewhat disappointed at the results of Mr. Fisher's experiments with whale oil soap. This remedy was an extremely valuable one, he had used it a good deal and considered that a good caustic potash fish oil soap such as the Ohio soap made by Mr. Owen, was one of the very best remedies against plant lice and bark lice of all kinds, moreover the amount of potash 12% was sufficient to act as a decided fertilizer to the trees. Many have noticed the good effect of this soap upon trees where it had been used. It was also claimed by the manufacturers to be an excellent remedy against the Peach Leaf Curl and some other fungous diseases. He considered that the thanks of the Society were due to the Honorable Minister of Agriculture for instructing Mr. Fisher to attend the meeting and to Mr. Fisher himself for the valuable and practical address he had given. Everybody who heard Mr. Fisher knew that he himself believed every word he stated, and that every experiment he recorded had actually been carried out by himself.

Prof. Webster, of Wooster, Ohio, spoke in complimentary terms of Mr. Fisher's address and said that his information was so valuable because he told us what he had seen with his own eyes, not what he had learned from others He himself was afraid to recommend crude petroleum for general use as he had known of several instances of injury to trees, but doubtless many successful experiments had been put on record.

A general conversation then took place on the subject of the San José Scale, and all united in the belief that the attack upon our fruit-trees is a most serious one and that

the owners of orchards in the infested districts should be warned of their danger and urged to take prompt and effective measures for the repression of the pest. A hearty vote of thanks was given to Mr. Fisher for coming to the meeting and affording so much useful information.

EVENING MEETING, WEDNESDAY, NOV. 14TH.

The meeting was called to order by the President, the Rev. Dr. Fyles, who spoke of the successful gathering the night before when we joined with the London Horticultural Society in a most popular and most interesting meeting It was quite proper he thought that the consideration of Horticultural topics should take precedence of Entomological, for Adam tilled the garden of Eden before the animals were brought before him to be named. He then gave some amusing instances of the tremendously long names that some of Adam's entomological descendants had been inflicting upon innocent species of insects.

ANNUAL ADDRESS OF THE PRESIDENT.

By the Rev. T. W. Fyles, D. C. L., F. L. S., South Quebec.

At our annual meetings, Injurious Insects—their ravages and how to check them, have very properly received a great deal of attention. In a population such as ours, largely engaged in agricultural, horticultural and fruit-growing pursuits, such subjects are of never failing interest; and our economic entomologists when they treat of them are very sure to receive attention. To-night I venture to direct your thoughts to a different phase of insect life, and to operations that are beneficial to vegetation; and I trust that we shall spend a short time pleasantly in the consideration of our insect friends, and the offices they serve for promoting the fecundity and improvement of plants.

Dr. Gray did so much to bring the science of Botany into popularity on this continent, and in Canada our excellent public schools have so effectively taken the subject into the *curriculum* of school-work, that now, when addressing an audience upon the instrumentality of insects for the fertilization of blossoms, it is hardly necessary to dwell upon the various re-productive plant-organs. A few brief statements to put you in remembrance of these will be sufficient on this occasion.

You know then that in the blossoms of a large proportion of plants there are, in the centre of each blossom, first, at the base, the *carpels*, and upon them the *styles* surmounted by the *stigmas*—these are the female organs. Around them are, secondly, the *stamens* or male organs each consisting of a filament bearing an anther containing pollen-grains. When these grains are ripe the anther bursts, and the pollen is scattered by various agencies.

For the fertilization of the blossoms it is necessary that some of the pollen-grains should alight upon the stigmas of the female organs. So alighting they adhere, because of a glutinous exudation from the stigmas; and, in a short time, there descends from each of them a sort of radicle, or very fine tube, which works its way down the style, and through, or between, the integuments, till it enters the micropyle and mingles its juices with those of the ovule. The work of fertilization is then complete, and the ovule produces a seed, which in due time and under favourable circumstances will produce a plant like unto that from which it sprang.

The blossoms of the wild rose, the apple, and the cherry are familiar instances of these bisexual flowers.

In many other kinds of plants there are both male and female blossoms—*staminate* blossoms and *carpellate* blossoms—growing on the same plant. Call to mind a field of Indian corn (*Zea mays*), well planted, well cultivated, and in full bloom. Such a field is a sight to gladden the owner's heart, and to excite the admiration of every thoughtful beholder. The tall plants tower over head, each surmounted by the graceful panicle of male blossoms, the anthers of which dangle like bells from the sloping roof of a Chinese pagoda, and scatter the dust of pollen at every puff of air or other disturbance. Below bursting from their leafy wrappers are the stigmas of the carpellary blossoms spreadin

like tassels of pale green silk to catch the pollen that descends. No bees meddle with these anemophilous blossoms; and it will be observed that they possess none of those things which attract insects, viz, bright colours, nectar and perfume.

Usually the seeds of pumpkin (*Cucurbita pepo*) are sown here and there among the corn, and the plants from them trail far upon the ground. The flowers of the pumpkin also are of two kinds, male and female, growing upon the same plant; but it is evident from the nature and position of the plants that the wind cannot effect pollination in their case: the agency of insects is necessary; and the blossoms are large and showy, and well designed to attract the bee.

Again in numerous instances the male blossoms grow upon one plant, and the females upon another of the same kind. Every grower of hops knows that for successful cultivation he must have male plants intermingled with the female. The proportion is, if I remember rightly, one in ten, or one in twelve.

The willow and the poplar are familar examples of plants of the kind we are speaking of. Who has not rejoiced to see, in the early spring, the golden catkins of the male willows, for they are tokens that "the summer is now nigh at hand?"

The country people in the south of England call the flower-laden branches of the willow "palms," for the blossoms come about Palm Sunday; and in olden times branches laden with them were carried to the churches, to represent the palms carried before our Lord on his triumphal entry into Jerusalem. In this word *palms* so applied we have a local popular name that would puzzle any to whom the circumstances of its application were unknown. And, with reference to this, if I may digress for a moment, I wish to point out that Mrs. William Starr Dana in that bright and useful little work entitled "How to know the Wild Flowers" has made a curious mistake for want of a little old-country "folk-lore." On page 124 she takes pains to shew that the word Marigold comes from "the Anglo-Saxon *mere* a marsh" and that the whole name may signify *marsh-gold*. Which (she says) "would be an appropriate and poetic title for this shining flower of the marshes," (p. 124). But Marigold simply means Mary-gold—the flowers of *Caltha palustris* having been used by our forefathers to garnish the churches on Lady Day (March 25th), just as the Pasque Flower was used at Easter, and the Michaelmas Daisy on the Feast of St. Michael and All Angels (Sept. 29th).

> "The Michaelmas Daisie among dede weeds,
> Blooms for St. Michael's valorous deeds,
> And seems the last of flowers that stood
> Till the feste of St. Simon and St. Jude"—

says an Old English Kalendar. But to return—

The willow-blooms are pollinated by means of insects. Small bees of the genera Andrena, Osmia, etc., as well as the honey-bee, frequent them in the day time, to obtain bee-bread for their young and nectar for their own delectation; and in the dusk of the evening hibernated noctuids resort to them for refreshment.

It is a common thing for European Entomologists to spread a sheet under the willow boughs at night, and then by a sudden jar upon the limbs to bring down a shower of moths. The drowsy insects lie inert whilst the operator with the aid of a lantern selects from them such as he fancies.

All these insects fly from flower to flower and from tree to tree and convey the pollen from the male to the female blossoms.

The poplars also are of two sorts, male and female—the staminate flowers growing on one and the carpellary flowers on the other. But in this case the blossoms are of unattractive colouring. They have no nectaries; and the pollen is light and dry. The wind is the agent of pollination in this case.

We have glanced then at three kinds of blossoms:—

Perfect—in which stamens and carpels grow in the same flower.

Monœcious—distinct male and female blossoms growing on the individual plant.

Dioecious—one plant producing male blossoms only, and another only females.

We have also noticed two means of pollination—(1) the agency of insects; (2) the agency of the wind. In some kinds of bisexual blossoms self-pollination takes place, as in the Mallow; but with these we have not now to do. Our attention is to be given to the insect-pollinated flowers.

Of the importance of cross-pollination—*i. e.* of fertilization with pollen from other blooms of the same sort, we may judge from the arrangements made in nature to secure it.

(1) First we notice the wonderful abundance of the pollen—sufficient for every requirement. Take your stand by an apiary towards evening, and watch the returning bees. How laden they are with bee-bread—which is compressed pollen—and yet in the course of their operations they have been instrumental in fertilizing thousands of blossoms. Yes, the busy workers have discharged their duties, and have not been stinted in their reward.

(2) We find that the various arrangements of the floral leaves, or perianth, for the shelter and preservation of the pollen are worthy of observation. Take that common flower the Dandelion (*Taraxacum officinale*). This flower is in reality an inflorescense consisting of a hundred or more flowerets packed together. This collection of small blossoms is surrounded by a green involucre—the whole forming a capitulum which closes tight on the approach of rain.

In the Sun-flower (*Helianthus annuus*), the capitulum bends over in wet weather; and the moisture is shed from the roof-shaped receptacle and the sheltering disk flowers.

In many of the lilies, the corolla forms a bell-shaped roof under which the re-productive organs lie in safety; and in the snap-dragon and other flowers of like structure they are shut up as in a cabinet—a cabinet which the bees know how to open.

(3) We learn that the relative positions of the various organs in many instances render self-pollination impossible.

The English Primrose (*Primula vulgaris*) affords us an instance of this. The flowers of the primrose are of two kinds. In one the style rises higher than the stamens, in the other the stamens are placed above the style. In either case the stigmas are at the same height as the anthers in the other. An insect comes to a flower which has a long style; its proboscis at a certain part is charged with pollen from the elevated anthers of a blossom which it has just left. As the insect rifles the long-styled flower of its sweets this pollen is brought in contact with the stigma which is at the right height to receive it. At the same time the proboscis of the insect is acquiring a fresh supply of pollen lower down from the short anthers and this it will convey to the next short-styled primrose blossom that it visits. It is *possible* that the short-styled flower may be self-pollinated; but it is quite impossible that the long-styled flower can be so.

(4) We see that the ripening at different times of the anthers and stigmas of some kinds of blossoms insures, with the aid of insects, the cross-fertilization of blossoms.

The Monk's hood (*Aconitum napellus*) affords us an example of this. The blue flower of the monk's-hood is really the calyx. Its uppermost sepal forms a sheltering hood in which the two posterior petals are hidden. These petals are of a remarkable shape, curved and clawed, and they secrete nectar which attracts the humble-bees. The monk's-hood is exclusively a humble-bee flower. The other petals are either wanting or are insignificant. In a newly opened monk's-hood flower the numerous stamens protrude and their anthers ripen before the stigmas. A humble-bee alights in the middle of the flower, holding on by the side sepals. In its struggles to reach the nectaries, the under part of its body is brought in contact with the anthers and becomes charged with pollen.

In the older blossoms of the monk's-hood the stamens all bend back out of the way, and the carpels are protruded. A bee alighting on such a blossom brings pollen to the stigmas now ready to receive it and the blossom is fertilized.

Another noteworthy instance of a plant which ripens its anthers and stigmas at different times is afforded by the Foxglove (*Digitalis purpurea*). The foxglove like the monk's-hood is a humble-bee flower. Indeed its form and size seem especially adapted for the reception of the humble-bee. The stamens and pistil are extended along the upper part of its inner surface. A humble-bee backing out, after sucking the nectar from the further recesses of the flower, scrapes off, by means of its bristly coat, the pollen from the anthers, and carries it on its back to other foxglove blossoms whose stigmas are ready to receive it.

The result of cross-fertilization seems to be the production of more numerous and finer seed, and eventually of stronger and more beautiful plants.

Some flowers have a wide circle of insect attendants. The Buttercup is known to be visited by more than sixty different kinds of insects (Percy Groom's *Elementary Botany*, page 121). Others are exclusive, permitting only the visits of a favoured few.

We have seen that the willow catkins are pollinated by bees and noctuids. The flowers of the Blueberry (*Vaccinium Canadense*) are fertilized by wasps which resort to them in great numbers. The round head and short lingula of the wasp fit well into the shallow saucer-like blossom.

Another plant that is visited by wasps is the Kalmia (*Kalmia angustifolia*). This also has shallow blossoms which have this peculiarity, each stamen is sunk in a groove the shoulder of which confines the anther. When an insect in search of nectar butts against the centre of the flower the stamens with their anthers are set free and start forward, scattering pollen on the front of the intruder. This pollen is carried by the insect to other blossoms of the sort and fertilizes them.

In early summer the Lilac blooms are visited by long-tongued moths, such as *Amphion nessus* Cram., *Hemaris thysbe* Fabr., etc, which fly in the daytime. In the dusk of the evening the white-blossomed perennial Phlox invites the larger hawk-moths, *Sphinx chersis* Hubn., *S. Kalmiæ* A. & S, *Deilephila chamænerii* Har., etc. The flowers of the Dogbane (*Apocynum androsæmifolium*) are favourites of moths of the genera Plusia and Thyatira.

Of the butterflies *Argynnis myrina* Cram. has a partiality for Golden Rod (*Solidago Canadensis*); *Pyrameis cardui* L. for Red Clover (*Trifolium pratense*); *Satyrus alope* Fabr. and *S. nephele* Kirby for the blossoms of *Asclepias cornuti*; *Pamphila Manitoba* Scud. for *Solidago lanceolata*, and so on.

In the Society's Annual Report for 1899 I gave the life-history of a small moth *Metzneria lappella* Zel. newly introduced from Europe. It is a burdock insect. Its larvæ feed on the seeds of the plant, and the moth itself feeds from and fertilizes the burdock flowers.

The flower-head of the Burdock (*Lappa major*) contains about forty flowers. They are compressed in a globular involucre, the imbricated scales of which are coriaceous and tipped with awl-shaped hooks. The calyx in each flower is represented by a dense circlet of delicate, white, silky and branched hairs surmounting the seed vessel. The corolla consists of a white tube half the length of the blossom, and then of a vase-shaped, purple expansion, five-cleft at the top. The brownish purple anthers are united and form a tube which produces pollen on the inner side. Through this tube when dehiscence occurs the pinkish white style forces it way, carrying with it the delicate, white, pellucid pollen-grains. The style then parts at the top into two branches which bear the stigmas on the upper surface. An insect carrying pollen-grains from other flower-heads intrudes among the flowerets and leaves pollen-grains attached to the stigmas. In its efforts to reach the nectaries of the flower it dislodges pollen from the freshly protruding styles and then bears it away to fertilize other blossoms.

The Evening Primrose (*Œnothera biennis*) is the special plant of *Alaria florida* Gn. The moth fertilizes the blossoms and is sometimes wrapped in the closing petals on the approach of day. Its larvæ feed upon the plant.

The honey-bee fertilizes the white clover and the humble-bee the red. Grant Allen in "Flash Lights of Nature" has drawn attention to the fact that as the flowerets in a head of clover are fertilized they droop over out of the way so that the bees may not be hindered in their work by vain endeavours.

Another flower that is pollinated by bees is the Nasturtium (*Tropæolum majus*). Three of its five showy petals at a certain distance within are set with a protective fringe, a veritable *chevaux-de-frize* to keep out small insects which would rob the flowers of its sweets and accomplish no good purpose. When a bee of sufficient weight enters, it bears down this fringe over the anthers, and at the same time comes in contact with the advanced style, the stigmas of which become charged with pollen which the bee has brought from other nasturtium blooms. The bee passes into the recesses of the flower, to imbibe the nectar accumulated in the spur, and as it does so the fringe and the stamens rise to their normal position. Having exhausted the supply of nectar, the bee backs and turns to make good its escape, and in its efforts to do so is covered with fresh pollen from the anthers of the flower.

The Campanula grown in our gardens (*C. medium*) has an interesting lesson for us.

The long flower-bud, yet unopened, encloses the tall pistil, along which the five filaments with their long anthers are extended. When the anthers dehisce the pollen masses adhere to the style leaving about a quarter of an inch at the top free. This projecting

part contains the five stigmas. As soon as the corolla opens the anthers shrink away from the style and shrivel up, leaving the pollen masses behind them. At the same time the five sections of the style part, and curl up ram's horn fashion.

Now comes the bee as the minister of Hymen. In this case it is *Megachile scorbicularis* Smith. The insect comes with its abdomen thickly coated on the under side with pollen from other blossoms. As it passes into the flower to get to the nectaries below some grains of the pollen with which it is already charged are scraped off by the curled stigmas and adhere to them. The bee secures a further supply of pollen ; but as it passes out of the blossom the under surfaces of the parted style take nothing from its fresh burden. Successive visitors completely clear away the pollen from the pistil.

The small pale flowers in the umbels of the Wild Carrot (*Daucus carota*), the Water Hemlock (*Cicuta maculata*), the Cow Parsnip (*Heracleum lanatum*) etc., are resorted to and fertilized by a very host of small flies and ichneumons.

The English Arum (*Arum maculatum*) also is fertilized by flies. The whole process of its pollination is described in that admirable work, Percy Groom's "Elementary Botany," published by Bell & Sons, London—a work which I can strongly recommend. The story is most interesting. The flies, covered with pollen from another arum, are drawn to the newly opened spathe by an ill odour which it gives out. They creep down the inside of the spathe through a palisade of fibres which grows from the floral axis and closes in a lower chamber—a veritable fly-trap. In this chamber around the floral axis grow, at the base, a number of sessile ovaries with sessile stigmas ; above them is a zone of sessile anthers. The imprisoned flies fertilize the ovaries with the pollen they have brought in, living the while upon nectar given out by the stigmas. Then the anthers above them ripen, and they become dusted with new pollen. When this is done, the enclosing fibres wither, and the flies escape to be again attracted by unpollinated arums.

The Skunk Cabbage (*Symplocarpus fœtidus*) and the Carrion Flower (*Smilax herbacea*) are mal-odorous Canadian plants that are fertilized by the aid of flies. Thoreau compared the smell of the latter to that of "a dead rat in a wall." Happily such plants are few in number and grow in out-of-the way places, or retain their offensive odors but a short time. They should serve to make us thankful—they tell us what might have been if God had not adapted the earth so favourably to the requirements and tastes of the children of men. In His great goodness He has filled it with beautiful forms and exquisite colours and harmonious voices and rich perfumes.

Asa Gray in his excellent little school-book entitled "How Plants Grow," has given reverent expression to some great truths. On page 96 he says :—

"Such a system" (The Natural System) "is not a mere convenience for ascertaining the name of a plant, but is an illustration, as far as may be, of the *plan of the Creator* in the vegetable kingdom. And the Botanist sees as much to admire and as plain evidences of design, in the various relations of the plants to each other (i e. in their resemblances and their differences), as he does in the adaptation of one part of a plant to another, and in the various forms under which any one organ may appear. The different kinds of plants are parts of a great whole, like the members of a body or the pieces of an harmonious but complete edifice or structure ; and this whole is the *Vegetable Kingdom.*"

Yes ! And when the student considers the bearing of the insect tribes upon this Kingdom, he finds yet further evidences of design, he sees yet more to admire, for he obtains a wider view of the plan of the all-wise and beneficent Being whose hand hath made all these things.

"The great Creator condescends to write
In beams of inextinguishable light
His names of wisdom, goodness, power and love,
On all that blooms below, or shines above ;
To catch the wandering notice of mankind
And teach the world if not perversely blind
His gracious attributes, and prove the share
His offspring hold in His paternal care."

COWPER, "*Hope.*"

The Rev. Dr. Bethune moved a vote of thanks to the President for his valuable and interesting address which had afforded much pleasure and instruction to all present. Mr. Dearness, in seconding the motion, drew attention to the fact that the beautiful diagrams

exhibited in illustration of the address were drawn by Dr. Fyles himself, who thus shewed that he was no mean artist, as well as an eminent entomologist and botanist. He then spoke of the method of fertilization of nasturtiums, and said that he had formed a different theory from that put forth by the President, and would now look forward to further investigations of the case. Mr. Bowman heartily supported the motion, and took occasion to speak of the danger many people incurred from their ignorance of the distinctive characteristics of poisonous fungi, mentioning the case of one that he had gathered this autumn, the immature specimens of which were destitute of the disagreeable odour belonging to the plant.

A PLEA FOR THE SYSTEMATIC AND ECONOMIC STUDY OF THE FOREST INSECTS OF ONTARIO.

By Prof. W. Lochhead, Ontario Agricultural College, Guelph

Ontario has an immense area of forest lands composed of hemlock, spruce, tamarac, balsam and pine. According to a recent report of the Forestry division of Ontario, "Of the 142 millions of acres comprising the province, about 120 millions of acres are still owned by the crown. Out of this, nearly 22,000 square miles, or 14 million acres are under license to lumbermen." The Government has very wisely done much to preserve these valuable domains from destruction by fire, by the appointment of a large number of rangers, who patrol, as it were, the forests and put out fires which may have been carelessly started by Indians, campers, or settlers.

There is, however, a danger, perhaps as serious as that of fire, against which no precaution has been taken. I refer to the danger of insect depredations.

Ontario is falling behind many of the neighboring States of the Union with respect to the great problem of the relation of insect work to our forest domains. Much work is being done by the Federal Government at Washington, and by many of the States where extensive forests exist, in determining the conditions which increase or decrease the extent of insect ravages. Already extensive experiments have been carried out, and much valuable information has been secured. The investigations have found that the amount of damage caused by insects in the large forests is enormous; and to prove that their results are worthy of consideration the very persons who are most directly interested in the preservation of the forest timber, the great lumber and timber companies, have readily come forward and assisted the investigator by affording every facility in the forest for a thorough study, and by money contributions as well.

In Europe every trained forester is well informed with regard to forest insects and knows how to combat their attacks; but in Ontario we are content to go along in our ignorance and pay no heed to insects or their ravages, probably because our forest areas are so large.

The questions will naturally be asked: "In what way can a study of forest insects help us in the preservation of our forests?" and "How can assistance be rendered in cases of serious insect ravages?"

In answer to the first question it may be said that a knowledge of the life histories of injurious forest insects is just as essential to a proper, intelligent campaign of operations as is a knowledge of life histories in our work against the foes of the orchard and garden. Systematic work must precede intelligent economic work; we must distinguish the economic forms from the beneficial or harmless species. In many cases it may be possible to utilize the beneficial forms as allies against the injurious forms, and in a well developed plan of operations the beneficial insects should be preserved from destruction.

I maintain, then, that a systematic collection of forest insects should be made so that we may become familiar with the forms; that a series of observations be made so that the life-histories of as many as possible be obtained for our guidance in combatting the injurious forms.

In answer to the second question proposed it may be said that hopeful results have been secured for American conditions of forestry which are so very different from those obtaining in Europe. In Europe the forests are carefully guarded, and a semi-military system of protection is in vogue in most of the continental countries.

In West Virginia it has been found that there is a proper time to fell trees to prevent damage by insects. Dr. Hopkins cut different kinds of trees twice a month year after year, and he got definite results for the oak and hickory for example. The timber cut in the winter months was gradually converted into a powder, while that cut during the summer remained almost intact. These results are confirmed in the practical operations in the forests, for it has been observed that certain species of trees felled in late fall, winter, or early spring suffer more damage than those felled in July and August.

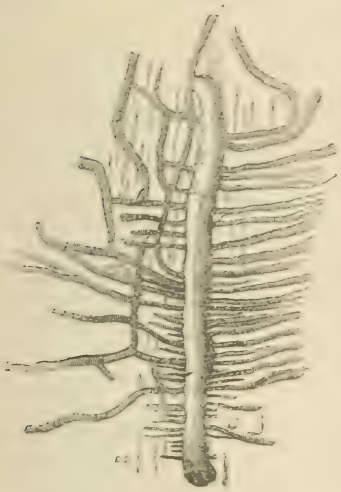


FIG. 1. Hylurgus piniperda.

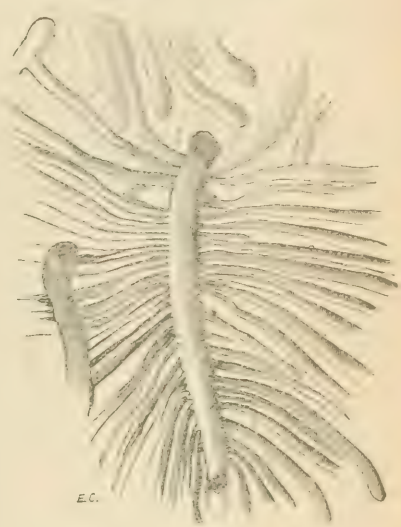


FIG. 3. Scolytus destructor. The beetle, magnified, and its burrows.
(See page 72.)

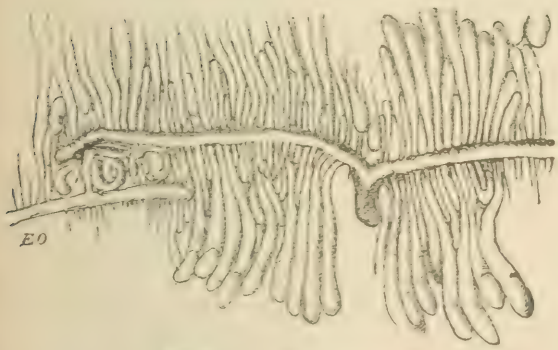


FIG. 2. Hylesinus fraxini.

Again, much has been learnt regarding the disposal of timber which has become affected, and the influence of lumbering methods and forests fires on the general problem of insect depredations. It is a matter of observation that unhealthy, weakened, dead trees are the most likely ones to suffer from insect attacks. Thus careless methods of handling timber whereby standing trees are girdled, branches broken and otherwise dismembered and disfigured, are very fruitful sources of insect distribution to those areas. These infested areas become centres of infestation to the surrounding forest.

In Ontario where lumbering operations are carried on in many isolated limits the danger is extremely great. The trees along the margin of the felled areas are very liable to lose their vitality on account of their inability to adapt themselves to the changed conditions which have arisen. If the lumbering operations are postponed for any length of time there is a great likelihood that the insects will spread from the felled areas to the unbroken forest, but where lumbering is carried on continuously in an area the insects find sufficient new felled timber and branches without betaking themselves to the unbroken forest.

The plan of forest-ranging for the prevention of fires is undoubtedly of tremendous value in the prevention of the spread of forest insects, but there is another work for the ranger. He could, if he knew more about insect conditions and habits, arrange for the

burning of certain felled areas at a time which would be the most favorable for the destruction of the insects which are preying upon the dead and dying trees. Such burnings, however, should be very carefully controlled so as not to injure the trees of the untouched forest, lest new feeding grounds be opened up for the insects.

Indirectly, again, the control of forest insects is of much importance. Dr. Hopkins, after a trip through the great north-west timber lands of Washington, Oregon and Idaho, states that his observations prove conclusively that forest fires originate, in very many cases, in timber areas which have been killed by insect depredators. The dead trunks and broken branches furnish suitable conditions for the rise and spread of fires.

The entrance of trunk and bark beetles into the trunk and bark of trees allows access to many timber fungi which penetrate the tissues, sap the vitality of the trees, and eventually kill them. The accompanying figures, 1, 2 and 3, illustrate the manner in which some common timber beetles burrow along the wood beneath the bark Recent studies by European and American mycologists show very clearly how very prevalent, as well as harmful, fungous diseases are in the forests. It is quite true that insects often attack healthy trees, and fungi gain entrance to trees which have not been attacked by insects, yet the fact remains that the presence of insect pests increases very much the harmful effects of fungi.

In answer, then, to the second question asked regarding the assistance which a knowledge of insect conditions can give towards the control of forest insects, it may be said in summary that much can be done (1) by cutting and felling timber at the most advantageous season; (2) making traps for insects by girdling and felling trees to which the insects are attracted in preference to sound trees, then by careful burning of these traps; (3) preventing the cutting of timber in many parts of a limit, as these parts serve as centres of infestation; (4) preventing careless methods of handling the unfelled trees so as not to injure them and thus to expose them to insect attacks; (5) preventing fires which we know destroy many trees and render them subject to insect attacks; and (6) introducing insects which prey upon injurious forms.

We are not in a position at the present time to carry out all of these methods, for we are ignorant of the life-histories and habits of the majority of the forest insects. Accordingly, I make a plea for the better studies of insects, and such can be best accomplished by a biological survey of the great timber areas of the Province. Such a survey must naturally be undertaken by the Government, assisted, if possible, by the holders of timber limits from the Crown. It is the duty of this Society to call the attention of the Government to the necessity for such a survey.

Professor Packard states in his valuable report on the Forest Insects, published in 1890, that "the number of insects which attack the different kinds of trees in the United States is sufficiently large to excite great fears for the future prosperity of our diminished forests, unless the Government interposes, and through the proper channels fosters entomological research in this direction. Our forests, moreover, are much richer in species of trees than those of Europe. We have, without doubt, on the trees corresponding to those of Europe as many destructive species as in Europe. But we have many more shade trees and forest trees of importance in the Eastern United States alone, and when we add to these the forest trees of the western Rocky mountain plateau and of the Pacific coast, and when we look forward to the attention which must be given in the immediate future to the planting of shade and forest trees on the great plains and in California, the subject of forest entomology assumes still more importance."

According to Kaltenbach the number of injurious insects which attack the forest trees of Central Europe is as follows:

Oak	537	species
Elm	107	"
Poplars	264	"
Willows	396	"
Birches	270	"
Conifers	299	"
Beech	154	"
Alder	119	"

It is apparent that neither the officials of the Department of Crown Lands of Ontario nor the members of the Royal Commission on Forestry Protection in Ontario consider

that insects do any injury to the forests, for in the report issued a few months ago, the insect problem is not even mentioned. Such an omission must be an oversight, due, no doubt, to the fact that none of the members of the Commission are entomologists. It would, indeed, be strange if our Ontario forest domains of such great extent form an exception to the general rule, and harbor no insects.

Dr. Fyles remarked that this paper dealt with a very important subject which deserves the serious consideration of the community. He then referred to the large areas in the Province of Quebec which had formerly been covered with forests of tamarac, but now were desolated by the ravages of the Larch Saw Fly and the timber rendered worthless.

Dr. Fletcher stated that the lumbermen usually say that in the Ottawa valley alone insects cause them a loss of a million dollars annually. This amount is merely an estimate, but it serves to show that they are aware of the losses caused by insects and realize how costly their ravages are. It is found that if the logs cut in the winter are not got into water, they will surely be attacked by insects and badly injured during the summer. A plan adopted in many cases is to turn the logs over from time to time during the summer so as to change the position of the portions exposed to light and those in contact with the soil; another method is to split the bark so that the inner part dries up and prevents the insect larvæ from living in it. These operations, however, are difficult to carry out, as the lumbermen cannot stand the flies which attack them in myriads during warm weather; this cause also prevents them from cutting timber in summer, which has been proved to be a better time than winter as far as the quality of the timber itself is concerned. The attacks of insects are always made upon dead or dying trees and such may usually be found on the edges of clearings where partially injured trees have not been cut down. In 1884 there was a great forest fire in the Ottawa valley, which left an immense number of burnt trees still standing. These were immediately attacked by insects and the loss would have been complete had not the owners of the timber limits at once set to work to cut and remove as much as possible of what was left. Any tree that is scorched with fire or partially burnt is sure to be attacked by wood-borers during the following summer.

Dr. Fletcher closed his remarks by moving a vote of thanks to Prof. Lochhead for his interesting paper; this was seconded by Mr. Dearness, and carried unanimously.

RESULTS OF SOME EXPERIMENTS IN PROTECTING APPLES FROM THE ATTACKS OF THE SECOND BROOD OF CODLIN MOTH.

By F. M. Webster, Wooster, O.

In Ohio, our attempts to protect the apple crop from attack by the codlin moth have given us varying results. Some years, spraying with the arsenites like Paris green, London purple and arsenite of soda have given excellent protection, and the apples have been very free of larvæ. Other years, though the spraying has been done with equal care and in proper season, the effect has been discouraging, to say the least. The causes for these varying results are not at all clear and there are some grounds, during some years, for the question as to whether, or not, it pays the orchardist to go to the expense of two or three sprayings and get so little in return for his labor, and other necessary expenditures, which spraying necessitates. Frequently the apples will pass through the season, up to late August, without exhibiting indications of the work of the apple worm, but after that the fruit seems to be seriously attacked and much damage done. There are with us, two periods of dropping of the wormy fruit. The first in late July and the fore part of August and the second setting early in September. Orchardists have declared that they could prevent the first, very largely by spraying, but the second baffles them. I have suspected, for a long time, that this was due to the attack of the second brood, and those who succeeded in protecting their fruit early in the season were, very largely, suffering from the results of moths developing in unsprayed orchards, and migrating during August to those that had been carefully and properly sprayed, thus infesting these after it is possible to protect them by the usual measures. In order to

test the probable efficiency of spraying, during the ordinary season for doing this, an experiment was tried in the orchard of Mr. William Miller, at Gypsum, Ottawa County, along the southern shore of Lake Erie. It was obviously impossible to get two trees exactly alike, and not easy to secure two greatly alike in close proximity to each other, but we selected two well in from the outer margins, and one of these we covered with netting, such as is used for covering baskets of peaches and grapes. The trees were sprayed for the last time on June 22nd and the covering applied the next day.

All fallen apples were removed from under both trees on August 29th, while there was a cessation in dropping of infested fruit, and, as we thought, all or nearly all of the first brood were thus eliminated. On September 14th, soon after the terrible wind that swept over the lake region, the spent tropical hurricane that devastated Galveston, Texas, there were removed from under the covered tree 229 apples, 59 per cent. of these being sound, their weight being 77 pounds. Under the uncovered tree there were 1,052 apples, only 10 per cent. of which were sound, and their weight was 214 pounds.

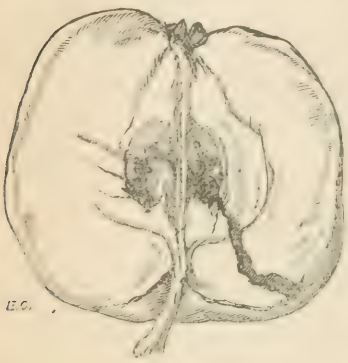


Fig. 4.

October 22nd, there were picked from the covered tree 107 pounds of fruit; 372 apples were sound and eight wormy. Windfalls, 18, all wormy. From the check tree there were picked 128 pounds of fruit, 253 apples being sound, and 41 wormy. Of the windfalls, 94 were sound and 104 wormy. (Fig. 4 illustrates the familiar appearance of a "wormy" apple.)

Recapitulating, the covered tree, after the fruit was removed from beneath on August 29th, carried 627 apples. Of these, 372 were gathered in a sound condition and 26 were wormy. The uncovered tree, after fallen fruit was removed on August 29th, carried 1,544 apples, of which 347 were sound when gathered and 145 were wormy. The summary would read thus: Covered tree, out of 627 apples, gave 466 sound and 161 wormy; the uncovered tree, out of 1,544 apples, gave 452 sound and 1,092 wormy. This, I think, shows pretty clearly what the result would be if we could manage the second brood of moths, and also who is to blame for the disastrous effects of the second in well sprayed orchards.

There are two other points worth mentioning. First, where a species is double brooded, the second brood is likely to be the most migratory in habits. Second, it is the outer rows in a well sprayed apple orchard that are most affected late in the season. Taking it altogether, the trouble does not appear to be with the spraying, but with those who do not spray at all, and who furnish the migrating female codlin moths that give origin to the second generation of worms in a well sprayed orchard.

In the discussion that followed the reading of the paper, Dr. Fletcher stated that he had that day seen a young larva about a week old, which evidently belonged to a third brood. It seemed clear that the best method of counteracting this insect was to spray for the first brood and bandage the trees for the second.

Mr. Bowman asked whether a late hatching of a third brood would not be a good thing, as then they would probably all be winter killed. Prof. Webster replied in the affirmative, and said that some years ago there was a severe frost in June, which nipped the leaves of the trees. Clisiocampa caterpillars had been very abundant, but they all perished from frost or want of food, and it was years before they became numerous again.

Dr. Fletcher mentioned that he had received some cocoons of the Tussock moth from Toronto, covered with eggs. They all hatched out recently under cover, shewing how near this species is to being double-brooded.

The next paper read was by Mr. Arthur Gibson, Assistant Entomologist of the Experimental Farm at Ottawa, on the "Life-history of Arctia Phalerata," in which he described in detail all the stages in the life of this insect from the egg, through the caterpillar and pupa to the perfect insect. As it was of a highly technical character, the paper has been published in *The Canadian Entomologist*. (Vol. XXXII., p. 369.)

Dr. Fletcher, at the close, remarked that such a paper as this indicated the lines upon which the best work should be done. It had been prepared with the utmost care and minute observations had been made at every stage of the insect's life. It was very important that life histories should be worked up in this way, as the imagoes alone are not to be depended upon in the separation of species. Very little is known about some of the commonest insects, and regarding others futher details are required to fill up the blanks in our knowledge. Every Entomologist should try to rear at least one species every year, and then a very great deal would be accomplished in the course of a comparatively short time. He then spoke of the mode of describing a larva, and explained Dr. Dyar's plan of numbering the tubercles and thus simplifying very much the work of description.

NOTES ON INSECTS OF THE YEAR 1900.

Division No. 2—Bay of Quinte District.—By J. D. Evans, Trenton, Ont.

During the past season the Forest Tent Caterpillar (*Clisiocampa disstria*) has done much damage in certain districts but not to such an extent as last season.

Grasshoppers caused some destruction to grain and pasture in some localities in the northern portion of the County, but only over comparatively small areas.

The pea weevil (*Bruchus pisi*) has come to be such a pest throughout Prince Edward County, that the seedsmen are looking for other and more suitable localities, in one case having transferred their operations in part to Lindsay.

The larvæ of *Phytonomus punctatus* were observed to be quite numerous in a clover field at Lake on the Mountains, near Glenora, Prince Edward County, on the 24th of May last. In very many cases the larvæ were curled up and encircled the tip end of the blades of grass, and apparently in a dying condition from either being parasitized or from some disease. At the same time and in the same clover field a number of examples were taken of *Hylesinus trifolii*, Muell. also eleven specimens of *Phytonomus nigrirostris*, Fab.

In July last unusual visitors appeared in a pear orchard owned by Mr. W. A. Warner and situated about 2 or 3 miles to the north-west of the town of Trenton. This orchard was about one acre in extent, in the midst of an extensive apple orchard, and had a few plum trees interspersed through it. About the third week of the month all the pear trees had their lower limbs swarming with small green caterpillars, there was no web nor did they suspend themselves by a thread, but seemingly dropped to the ground when satiated or when the tree was struck, then crawled towards and up the trunks again to the higher branches. The trunks of the trees and the ground, in places, were fairly green with the crawling masses of them. The caterpillars were from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long when first noticed, of a dark green colour at one end and a lighter green at the other. The apple trees in the immediate vicinity had a few of the caterpillars but the plum trees were not visited by them. A thorough spraying destroyed them all. It was not until about two months thereafter that the writer became aware of their visit through a letter from Dr. Fletcher. The above particulars having been procured from Mr. Warner at such a long interim from their appearance, further information could not be elicited.

There has been a great scarcity of moths during the past season as compared with last, very few coming to light and they only of the commonest species.

Division No. 3.—Toronto District.—By D. G. Cox, Toronto.

Owing to other duties the writer has had very limited opportunities for observing the insect ravages of this district during the past season.

The Tussock Moth (Orgyia leucostigma) is still with us and has caused considerable damage to the foliage of the horse chestnuts in some localities. The civic authorities did considerable spraying of the foliage in the early part of the season which no doubt destroyed the young larvæ in large numbers. The pest appears to be diminishing and if they keep on fighting it, they will eventually succeed in getting it under control.

The Tent caterpillar (Clisiocampa Americana) was in considerable numbers on the wild cherry trees around the suburbs of Toronto, and many orchards were rendered unsightly by the tents. The Cabbage Butterfly (Pieris rapae) has been unusually numer-

ous this year in this locality, and the cabbage and cauliflower crop in many gardens has consequently been considerably damaged by the larvæ of this common pest. The cabbages were so badly perforated by the caterpillar as to render them unmarketable. I observed also in gardens where no cabbages were grown, that the turnips and radishes were severely attacked by this larva.

During a trip taken through Scarborough and Markham townships in the latter part of July, I visited several farms and found considerable damage had been done to the turnip crop by what appeared to be the larvæ of (Noctua C-nigrum). In some fields 40 per cent. of the crop had been cut off and the farmers were re-sowing seed in the bare places along the rows that had been destroyed. I did not know the best remedy to recommend to prevent the ravages of this cut worm, but advised them to apply to Dr. J. Fletcher, the Dominion Entomologist at Ottawa, who would give them valuable information which would be of great benefit to them in combating the ravages of the insect.

Around one of the farms I visited there were planted about two-thirds of a mile of European Mountain Ash trees (Pyrus acuparia). These trees were about fifteen years old and were so badly infested with the larvæ of the Flat-Headed Apple Tree Borer (Chrysobothris femorata) that the writer picked from the outer bark of one tree ten young larvæ about five-eighths of an inch long, several other trees were examined in the row and found to be in the same condition. Quite a number of the trees had already been killed by this pest. I advised our friend the farmer to pick out as many of the larvæ as he could during the months of July and August, after that they would have penetrated into the heart of the tree and consequently could not then be reached. I also told him to paint the trees next spring with a thick solution of soft soap and washing soda before the beetle oviposits so that the young larvæ will have difficulty in penetrating the bark. The ravages of this beetle seem to be confined more particularly to the trunk of the tree; from the ground up to the first branch. I found no evidence of larvæ above the first branch in any case.

The Spruce Gall-louse (Chermes abietis) does not appear to be so abundant in this locality as formerly.

Division No. 4.—Hamilton District.—By James Johnston, Bartonville.

Want of time during the past season has prevented me from doing but very little insect collecting so that my brief report is mostly made up from my observations on the farm during my daily occupations.

During May and most of June cut worms were very troublesome, being more numerous than I have ever known them to have been. Systena blanda, Mels (the pale-stripped Flea-beetle) has been quite numerous. Eight years ago when I first noticed these little beetles, they seemed to confine themselves almost entirely to rag-weed, but each year since then they appear to be taking to other plants as food, and now they may be considered destructive to turnips, pumpkins and strawberries. Last season a few choice pumpkin seeds were planted and in the course of a short time when I went to see how they were doing I found the plants thickly covered with these beetles making them appear as if sprinkled with ashes, and, on my approaching, they all vanished, being very quick.

July 22nd, Crioceris 12 punctatus, Lin. made its first appearance in our asparagus patch when I took seven specimens. As the season advanced they increased in number so that I fear by next season it will be reckoned amongst our already too numerous garden enemies.

Aug. 17th, Colias eurytheme, Bd. In crossing the clover meadow where C. philodice was very numerous I noticed this orange-colored beauty which I secured with my sun-hat after a hard chase. It is a beautiful large specimen which is of double interest to me as it is the first of the species I have taken, and differs from those in my cabinet by having the front half of the fore wings a pale yellow.

Aug. 30th, Nonagria subflava, Gr. This is the third specimen of what is, as far as I can learn, a rare insect during my years of collecting. I took it in the house having been attracted by the light in the kitchen.

Aug. 31st, Catocala nebulosa, Guen (1 spec.) and C. Robinsonii, Gr. (2 spec.).

These two species I consider an interesting capture as both species are new to my collection and possibly to Canada as I have never heard of them as being Canadian species.

This I should say has been a year favorable for this very interesting genus as they have been unusually abundant in this locality. I missed all the early kinds as I was unable to look after them before Aug. 18th, but after that succeeded in taking seventeen species, amongst them four C. desperata, Guen., of which I never took but one, and it several years ago, and a doubtful specimen, possibly a variety of C. paleogama.

In the early part of the season I noticed that some insects were doing much damage amongst the strawberry plants by eating the heart leaves while young and tender and I was at a loss for some time to discover what they were, but finally I detected a black beetle doing the mischief, and by keeping watch I saw several doing the same thing so I have made up my mind that they are the mischief makers. They straddle the leaf and very soon destroy it as they eat quite greedily

Division 5.—London District.—By R. W. Rennie, London.

That most exasperating of all injurious insects, at least to the average gardener, made its appearance last spring in unusually large numbers, viz., the Cut Worm, mostly the larvæ of *Hadena arctica*. There seems to be a considerable amount of uncertainty in regard to the appearance and disappearance of this insect.

In 1895 the moths were flying in immense numbers. The following spring the larvæ did great damage, but when the time arrived for the appearance of the moths, those of us who were expecting a great number, were disappointed, as very few appeared.

Again this year, the larvæ were exceedingly plentiful, but the mature insect, at the time it should have appeared, was in very small numbers. I have not seen any explanation offered for this heavy mortality amongst the pupæ. Remedies proposed :—Placing bunches of grass, clover, etc , saturated with Paris green along the rows. This is of very little use, the young larvæ are not such fools as to eat withered foliage, when they can get the fresh article right at hand. But a mixture of bran and Paris green seems to be very much to their taste, while not neglecting the plants altogether for the bran mixture, they are more inclined to try it than anything that has been proposed up to the present.

Cabbage root Maggot.—This insect has been quite destructive this year, the only remedy so far that has been beneficial has been to wrap the stems of the plants when transplanting with tar paper. In the August number of the "Canadian Horticulturist" there is a suggestion from one of the staff of the Guelph Agricultural College, namely, to try a tablespoonful of carbon bisulphide in a hole at the base of the young transplanted plant. This may prevent the mature insect from depositing her eggs on the plant, but, with carbon bisulphide at twenty cents per pound, and cabbages at twenty cents per dozen, I think that the gardener had better quit growing cabbages. The cost for carbon alone will be about ten cents per dozen plants. The recommendation of such a dangerous insect destroyer as carbon bisulphide I think should be condemned ; it may answer very well for laboratory experiments, but in the hands of the general public, may be the cause of numerous accidents, which will result in all probability in a general distrust by the public of trying any new insecticide with the chemicals of which they may be unfamiliar.

Red Spiders.—This mite has been very destructive this year to growers of sweet peas. It has got to be such a pest that most lovers of this flower in this section will be forced to abandon their cultivation. Last season, although a grand season for the pea family here, was very short, ending about the middle of August, due almost entirely to the ravages of the red spider.

Cold water spraying is not sufficient to keep them under control. To apply an emulsion you will have to have a pump capable of delivering the emulsion at at least thirty-five pounds pressure.

Root Aphis.—This pest appeared in quite large numbers this year attacking sweet peas and asters. I have seen no preventative proposed. Aphides were very numerous this season. I have seen whole fields of cabbages almost entirely covered with them. Spray with kerosene emulsion, or if you have a water pressure of sixty or seventy pounds use water only.

NOTES ON THE SEASON OF 1900.

By J. Alston Moffat, London.

Ravages by cut-worms were reported to me from far and near as being unusually severe. And several kinds of moths presented themselves to my notice in conspicuous profusion later on, as probably coming from such worms; such as *Agrotis C. nigrum*, *Mamestra devastatrix*, *Hadena arctica* and several others in lesser numbers, whilst toward the end of the season *Agrotis subgothica* (Fig. 5) was in great abundance.

Fig. 5.

A most unusual outbreak of *Crambus exsiccatus* made itself manifest in the early part of June, and lasted well into July. Early on Sunday morning, June 10th, I was walking down the delightfully quiet street, when my attention was attracted by the singular appearance of the pavement in front of me. I thought it was covered with peanut shells, broken up very fine, and fancied some boys had been having a feast on the previous evening, but on reaching the spot I found the strange appearance to be produced by the wings of that moth. I looked up, and there was a restaurant lamp overhead, and the light from it had dazzled the moths and brought them down, when they got trodden underfoot by the travel of the previous evening, until the stone pavement, for a space of eight feet in diameter, was literally put out of sight with their remains. How many deep I could not say. If this was but one of many such "slaughter pits," which it is reasonable to believe was the case, then how little conception one can form of the multitudes of them that were destroyed in one night; whilst it made no perceptible reduction to the numbers left in the fields or at the lights. Then to think of the injury done to crops—grasses mostly—during the feeding up of the larvæ for the production of such swarms of moths, whilst the cause of such injury would be all unseen and unsuspected by those suffering from their depredations.

The notorious "Buffalo Bug," sometimes most misleadingly called "moth," to which it has no resemblance, it being in reality a beetle, *Anthrenus scrophulariæ*, Linn. (Fig. 6 *d*), has become an established pest in London. Early in the year I took the beetle on the windows of the Y.M.C.A. building; and complaints of its depredations were heard from various parts of the city during the summer. About the first of August two larvæ were brought to me by a lady; one seemed full-fed, the other about half grown. The one pupated about the first of September, and gave forth the beetle in October, the other was still feeding at the end of the month, but died before maturing. The larval stage is the only form of its existence known to the majority of housekeepers, which is correctly represented at Fig. 6*a*, greatly enlarged, the line at the side indicating the natural size, and they would hardly believe that the beetle at *d* was the same insect, or one from which they had anything to fear. The beetles are black, ornamented with white and red, but are extremely variable; so much so that three forms have received distinguishing names. It is a European insect, but there it is spoken of as a "Flower Beetle," although known to enter houses and destroy "furs, clothes, animal collections, and even leather and dried plants." It was on this continent that it first obtained its notoriety as a carpet pest, the habit here of tacking down carpets for a year giving it a splendid opportunity to propagate undisturbed; with this, as with others of its kind, frequent

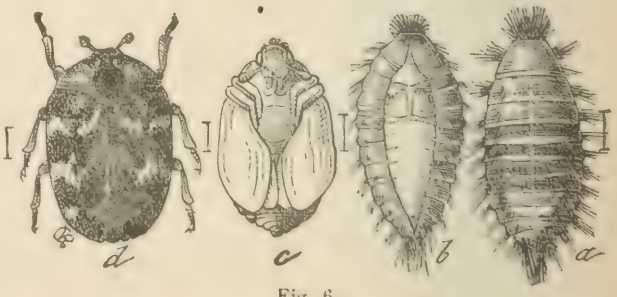


Fig. 6.

stirring up is an excellent means of deterring them from indulging their destructive propensities. And now that it is here to stay, as it is not entirely depending on indoor propagation, so cannot be exterminated except locally, there is nothing for it but to give it due attention; and to combat it successfully, a knowledge of its nature and habits must be acquired.

Having learned to recognize the beetles, they may be seen upon the windows in early spring and destroyed before they have an opportunity to deposit their eggs, and thus prevent future trouble from them. In nature it takes a full year to complete the round of its existence, but with the artificial warmth of houses it matures in shorter time, and beetles may be found on windows before the end of winter.

When once a dwelling has become infested, not only should the carpets be thoroughly beaten, and disinfected, but narrow strips of thin muslin should be fastened over the joints of the floors with varnish before relaying, so as to prevent them secreting themselves there. A strip of tar paper laid under the outer edge of the carpet is an excellent preventative.

When they are known to be at work and it is not convenient to lift the carpet, benzine will kill any living insect that it is brought in contact with, but great care must be exercised in not allowing a light to approach it while it is evaporating, as it is very inflammable. A damp cloth and hot iron will also effectually arrest the operations of any depredators upon whom they are applied. Steam or benzine may also be used to advantage to get rid of their presence in upholstered furniture; by such means can their operations be restrained and rendered comparatively harmless. But constant watchfulness against their presence is required, for even if a dwelling has been freed from their presence during one season, the beetles may enter at the open windows the next summer and start a colony afresh.

There is another beetle with similar habits belonging to the Dermestidæ, *Attagenus piceus*, Oliv., whose larva is about the same size and hairy character as that of *Anthrenus scrophulariæ*, which it closely resembles and might easily be mistaken for, as they are sometimes found associated; but the beetles are quite different in appearance, *Attagenus piceus* being much longer than wide, a flatter insect and entirely black. This also will have to be guarded against, as it is just as destructive a carpet pest as the other, and in some instances becomes the most numerous of the two. For some time past it has been more troublesome in the Society's collection than *Anthrenus varius*, which is supposed to be the standard museum pest.

A friend in the country, in one of his recent letters to me, conveyed the following item of information, which may serve as a warning against the employment of cheap labour: "We got lots of help to thin our turnips this year. Some big green fellows came along who gave us their assistance and worked for their board; but they made a bad job of it. After we had thinned some rows they would go round and thin them over again, and they left nothing whatever in some rows, but that may have been because they worked at night and did not see what they were doing."

During the remarkably fine weather we were favored with during October, winged *Aphis* were in great abundance, and made walking on the streets quite unpleasant, especially where there were shade trees. One evening when the setting sun illuminated the hazy atmosphere and the tiny wings reflected the light conspicuously and made each individual stand out distinctly, I made an effort to estimate how thick they were. By stopping at different points and watching closely, I estimated there was one to every four inches of space. Before they had all gone, those mosquito-like merry dancers (*Culiciformis*, Latreille, some of whose larvæ live in water and others feed on fungus,) made their appearance, who from some inherent perversity of their nature, congregate in living columns over the sidewalks, with their densest portion about the level of one's face, which one must either go through or turn off the walk to get round, when one would think that any other portion of the street would serve the purpose just as well. One warm summer's day, I took a seat in a pleasant shade, put my light colored straw hat on my knee, when one of these groups formed over it and commenced a jig close to my face, some of them striking it. I swept them away several times but they always returned and gathered as before. I began to suspect that the hat was the centre of attraction, so I placed it on the seat an arm's length away, when they immediately formed their dancing party over it there and kept it up until I took it to leave. So it would seem as if they iked to have some conspicuous object beneath them to keep the crowd in line.

There was sent to me by Mr. J. Tanton of this city, a most singular looking creature of the class *Myriapoda*, and shortly after another was brought by Mr. C. E. Abbott, both of them supposed to have come in packing, and had attracted their attention as something quite unusual. From information received by me at our annual meeting, it proved to be *Cermatia forceps*, Rafinesque, of the family Scutigera, and the first reported appearance of it in Canada. There is an excellent figure of it in the fourth report of the N. Y. State Entomologist for the year 1887, page 129, and from that article I have gathered the following information: It is properly a southern resident, but has been gradually extending northward, until it has now become well established in most of the eastern States. Its body is when full grown, about an inch in length, with a uniform width of a quarter of an inch, but rather narrower at the hind end. It has fifteen pairs of long legs which terminate in a black, sharp hook. The front pair of legs are about half an inch in length, the others gradually increasing in length to the second last pair, which are about an inch and a quarter, whilst the last pair are an inch and a half or more. It is known to be carnivorous, feeding upon insects, for which it enters and frequents houses, and when seen for the first time, is sure to attract attention by its grotesque attitude and rapid movements, and may even create alarm; but for which there is no cause, as it is extremely timid and anxious to escape. Yet, from its anatomical structure it is suspected that it may be poisonous, but there is no authentic instance recorded of its ever having inflicted injury to a human being. From Insect Life, Vol. 3, P. 85, I copy the following: " Mr. Webster spoke of the predaceous habits of *Cermatia* and its preying upon the Croton bug. Mr. Fletcher had observed the insect with Mr. Howard, at Washington. Its mode of capturing the Croton bug before devouring it was remarkable. It sprang over its prey which was thus encaged between its many curved legs "

The unusually warm weather in October, had the effect of bringing to maturity great numbers of the Tomato Sphinx, and many were captured on the wing. I secured a fine, fresh specimen on a shop front in the principal thoroughfare of the city on the morning of the 19th.

Anosia Archippus was noticably scarce through the season, as compared with the previous year, and yet Messrs W. E Saunders and H. Gould saw them on the 19th of September, accumulated in such multitudes on the trees at Point Pelee, as to put the green of the foliage out of sight, whilst the lower branches were drooping with their weight. On the 27th of October, the janitor of the Y. M C. A, brought me a living specimen which he had taken from a bush, helpless from the coldness of the day; bright and fresh, as if newly hatched. It was very lively in warmth and sunshine, and fed freely, but dormant when the room was cold. On two occasions it remained in the same position from about four o'clock Saturday afternoon, until near noon on the Monday following. On the 13th of November, I allowed it to remain too long on a frosty window, from which it never fairly recovered, and it died on the 16th. It retained its bright colors to the last. It was a female. I opened the abdomen and made a microscopic examination. It was very fat, but I could see nothing whatever to indicate the presence of eggs.

ANOSIA ARCHIPPUS, YET AGAIN.

By J. Alston Moffat, London.

In a series of most interesting and instructive articles on the Migration and Dispersal of Insects, by J. W. Tutt, F. E. S, editor of "The Entomologist's Record and Journal of Variation," London, England, after a reference to the methods of many different insects, he arrives in due course, in the July number, 1900, to a consideration of what has been written upon the movements, spring and autumn, of *Anosia Archippus*, Fab. (Fig. 7) and the claims that have been put forth for it, as differing in many respects from all other butterflies. The opinions that he has formed from a consideration of what has been written upon the subject, and the conclusions he has arrived at upon it, can be gathered from the following extracts taken therefrom:

"So far as one is able to get at the real facts (i. e., apart from the opinions of observers,) one is able to conclude that the movements of *Anosia Archippus*, in North America, are very similar to those of *Pyrameis cardui*, (the Thistle butterfly) in Europe." After quoting from various sources, Mr. Tutt adds: "All these irregularities of habit will be certain to strike one who has studied the subject, as being readily paralleled during a series of years by the immigrants of *Colias edusa* and *Pyrameis cardui*, and their progeny in our own country." That is, Britain.

After quoting a diversity of individual opinions and contentions, he continues, "However little definite information there is about the spring migration of *A. archippus*, a great number of observations have been recorded of a habit that is certainly unknown in any of our most observed Palæarctic migrating species. This is the habit of swarming in the autumn." He then gives a large number of instances that have been observed by different persons, of autumnal swarms passing over various parts of the continent; then continues, "One other observation may be added, that of Bowles, who states that he has himself seen the shores of Lake Ontario, near Brighton, strewn with hundreds of their dead bodies, cast up by the waves, and which no doubt had formed part of a swarm, which from weakness or some other cause had perished while flying across the lake." Then Mr. Tutt sums up his conclusions upon the subject thus:

"From these and similar observations it has been concluded that the swarming of this butterfly in autumn is analogous with that of birds before commencing their flight

Fig 7.

southward, and that, after swarming, the butterflies return to the sub-tropical lands whence their grandmothers and great grandmothers set out in spring. It is admitted that the climate is such, in the northern territories to which the species annually spreads, that the butterfly cannot possibly exist in the winter, and Riley, who first propounded the return theory, himself confesses that "under the most favourable conditions a large majority perishes." As we have said, Scudder accepts the theory as fact, and practically writes as if it were proved beyond question of dispute. For ourselves, although we know of no exact analogy among butterflies of a similar swarming habit, yet, in every other respect the similarity between the habits of this species and our own European migrating species, *Pyrameis cardui*, *Colais edusa*, etc., is so great, both as to the continuous-brooded habit, and also as to Dr. Thaxter's observation that the males and females in the autumnal swarms pair, that we are inclined to doubt the conclusion. It has never yet been shown that the journey has been successful. The swarms are sometimes noted as going in a different direction from that assumed by the theory, and much more evidence is necessary before even an approximation to success can be admitted. For ourselves, we doubt whether the return journey has ever been successfully made, and we consider that there is altogether insufficient direct evidence to warrant the assertion that the autumnal swarms of *Anosia Archippus* migrate from the more northern parts of its summer range in America, to the south, in order to winter there. Some of the quotations which we have just reviewed, and others mentioned by Riley, show distinctly that the swarms do sometimes fly more or less from north to south, or from north-east to

south-west; but the general opinion that one is compelled to form, after reading most of the notes relating to the autumnal swarming of this species is, that the large congregations of butterflies that then collect will, given fine calm weather, stay long (in swarms) in one place, and the evidence is altogether insufficient to show that these go south-west rather than in all (or any) directions apart from weather conditions."

When one's opinions are distinctly challenged, one naturally feels a desire to vindicate them; and as there is much in these quotations that is in direct opposition to my belief on the subject, which has been largely formed upon actual observation, influenced no doubt by what I have read, I shall review them somewhat in detail, in an attempt to make it clear that I, and many others on this continent, have not wholly misunderstood what we have seen. Mr. Tutt seems to be needlessly skeptical on some points, in view of what he informs us of the wonderful performances of this butterfly, which he appears to accept; and I doubt not that a little personal observation would convince him of it.

I know nothing of the habits of Pyrameis cardui in Europe except what I have read; but in this country, my attention was soon attracted by its periodicity when I began collecting. I have seen in some seasons, cloverfields just alive with fine, large, rosy specimens; whilst in others I have watched carefully for them all summer and not seen one. I have seen its larva in such numbers as to consume all the thistles in one field, and cross the road in masses to another for fresh food, whilst the whole neighbourhood became alarmed that their crops were to be destroyed by an invasion of the army worm. I came to the conclusion that they appeared every third year; and sometimes then only in very moderate numbers, yet I never observed anything in any of its peculiar habits, to in any way correspond with those of Anosia Archippus. It is rather unsafe to draw, confidently, conclusions from analogy when dealing with insects.

In the quotations made by Mr. Tutt from the few recorded observations made by different individuals, of the movements of Anosia Archippus; their gathering together in swarms preparatory to their migrating, and their passing over the country in flocks, have got somewhat mixed, some of them referring to the one, and some to the other. All admit their assembling; the purpose of their assembling has to be inferred, which gives plenty of scope for the play of the imagination. The butterflies take weeks in collecting before they depart. Having chosen their rendezvous, they have to come together from a considerable extent of territory around, to accumulate the multitudes they often do, and that takes time. How those at a distance get to know of the spot is a very interesting and puzzling thought, but that they do in some way is a fact. Now, it is during this gathering process that the coming in the evenings and the going in the mornings has mostly been observed, and is usually kept up for a length of time, regardless of the weather. No one observing these movements could help wondering and enquiring what the object of such conduct could mean; and if informed about their migratory habits, and watching them to the end, he would be satisfied that it was in some way intimately and directly associated with their intention to leave, and was preparatory to that very purpose. We cannot tell how their minds act in connection with the subject; we can only express our convictions in accordance with the operations of our own, drawn from observation. As the time approaches for their departure, which for this locality is about the first of September, the great majority that compose the swarm, gets into that singular dormant and listless mood, which is another very perplexing state of mind to account for, but which no doubt is also intimately associated with their future intentions; they will remain for days in what appears to be a state of semi-hybernation, when they show no great desire even for food. I have only once had the pleasure of watching one of these swarms assembling, but from all accounts it was quite characteristic of their doings at such a time. Some of my published observations will allow of expanding and commenting upon.

The woods where I saw the assembling of *A. Archippus* as recorded in Can. Ent. Vol. 12, p. 37, was that in which the asylum buildings at Hamilton now stand. My visits to it were made every other day. I saw the butterflies there three times, which would cover five days, and to the last they were perceptibly on the increase. I would get there about half past one, when I would find them hanging in clusters, quite motionless except when disturbed. That they should be there at that time of day, in that condition, caused me to wonder greatly. Whether they had been out in the morning or not I cannot say;

but when I would be leaving about half past five, individuals were still arriving, and some of them had to descend quite a distance to the tops of the trees as if they had traveled from afar, and not at all like ones that had been feeding in the vicinity. During these observations the weather was fine, what it may have been when they left I do not know as I did not see them go, which must have occurred within three days after my previous visit. The swarm that I saw just starting out on its journey, Can. Ent. Vol. 20, p. 138, was in a locality about thirty miles east of Hamilton. I was there upon a visit, and had gone out to a field, with many bushes about stumps and fence corners, to look for moths and beetles. Whilst engaged in my search, my attention was diverted by the numbers of *Archippus* that were floating around me. When I looked up I at once realized what was going on. My eye traced the stream to a wood from whence it was issuing, which was on the far side of the field, and thither I made my way. As soon as I entered the wood I was struck with the contrast which the attitude of these presented to those of my former observation. There, quiescence; here, animation. Everywhere I looked there was movement; but not of the wings. The whole swarm was evidently controlled by one impulse; and in presence of it I could not resist the conviction that it was associated with their going. Were they just arousing themselves from a previous state of lethargy? The seemingly few that were on the wing and making for the open were coming from the far side of the wood, which was out of my sight, as well as of those that were near the front, and were closely following those that had already started. And this gives us a clear idea of how these long drawn out flocks that are so often seen passing over different parts of the country are produced, and I have always considered myself as particularly fortunate in seeing this illustration of how it is done. Although those high in the air were keeping to a comparatively direct course, there were hundreds of them in sight that were swooping and swirling around the bushes in the field; yet they never allowed a gap to form in the procession. The weather at the time was fine; no storms in view, past, present or prospective, to influence their movements.

That swarms will encounter storms, both while forming and upon their travels is certain, and that their movements will be to some extent modified by them is also certain. But my conviction is, that they will invariably choose fine weather for starting on their pilgrimage. Here is what Mr. J. A. Allen has to say of their movements in Iowa. Trans. Chic. Acad. Sc., i. 331. "This extremely abundant butterfly seems to prefer the open prairie, but is driven to the groves by the winds which sweep furiously over the prairies in the summer months, and especially in September; here the butterflies are collected in such vast numbers on the lee sides of trees, and particularly on the lower branches, as almost to hide the foliage, and give to the trees their own peculiar colour. This was seen not in one grove alone, but in all of those that were visited about the middle of September. If unmolested, they remained quietly on the trees; if disturbed by blows upon the trunk or branches of the tree they would rise like a flock of birds, but immediately settle again, either on a contiguous tree or upon higher branches of the same. At New Jefferson, a little later in the year, when the gales had abated, they were seen leaving the groves in vast flocks, and scattering through the air almost beyond reach of the eye." There we have a picture presented of collecting swarms. But I suspect that Mr. Allen has slightly mistaken the purpose of their collecting, which was not so much to obtain shelter from the furious winds, as to prepare for their future journey, as disclosed by their leaving later on. My impression is, they rather enjoy a stiff breeze, and understand well how to manage themselves in it. But what interests us most in this connection, is, that they did not start out until the gales had abated.

That these autumnal swarms of *Anosia Archippus* leave the northern portion of the continent and go southerly, is, I think, the firm conviction of most, if not of every entomologist in North America. Which is not surprising when we know that they have never been seen going in any other direction in the northern portion of it. That but few observations have been recorded by competent persons, compared with the importance of the subject, is acknowledged by all. That there are so few interested and competent individuals on the routes these swarms travel, to make observations, compared with the extent of territory over which they have to pass, is confessed and lamented by many; yet the few observations that have been made, defective as they are, when dates and localities are tabulated, exhibit a progressive movement in that direction, which sus-

tains and confirms the general opinion on the subject. Take these which are referred to by Mr. Tutt:

Saunders, Port Stanley, September 1st.
Scudder, New Hampshire, do 2nd.
Peabody, Wisconsin, do first week in.
Dr. Hamilton, New Jersey, do do do
Mundt, Illinois, do 7th.
Anonymous, Ohio and Indiana, September 19th and 20th.
Dr. Ellzey, Maryland, do 23rd and 25th.
Dr. Neal, Texas, October 4th and 6th.

Dr. Thaxter, Florida, being without date, may be placed anywhere between 1st November and last of February; whilst he is reported in another place as having said, "that he had found *Archippus* wintering along the Gulf of Mexico in immense numbers." Which taken in connection with the fact that there is not enough of their foodplant there, to produce a tithe of them, is strong presumptive evidence that those there seen had come from the north, where we know they are bred in countless numbers. That many of the travellers will perish by the way is what is to be expected, but that the bulk of one of these swarms could not complete the journey from their northern limit to the Atlantic coast, is not to be thought of in connection with a butterfly that has succeeded in reaching a land 2000 miles across the ocean from the American continent.

In reference to Mr. Bowles's observation, Can. Ent vol. 12, p. 134, which was a valuable addition to our information of its habits at that time, but proves nothing, except that the butterfly is a wanderer and liable to be overtaken by a storm and perish, whilst in the act of crossing our great lakes; I have seen specimens of it that were thrown up with the drift on the north shore of Lake Erie. I have seen the west shore of Long Point strewed for miles with their wrecks after a storm. And I have picked up some of them, apparently dead, placed them in the sunshine and seen them revive and fly away. These were bright fresh specimens of that season's production. But that any of them had fallen into the lake from exhaustion by long continued flight, I would say for that butterfly; never! Its mode of flight is so easy and graceful, that it looks as if it could remain on the wing indefinitely without tiring; it indicates amusement rather than labour. It never appears to be in a hurry; unless it has got a fright, and then, racehorse speed is slightly suggestive. During oviposition, the female gives one the impression of her being intent on business; and moving from place to place with great speed; but her progress is made in long sweeping curves, with scarcely a flutter of the wings, which does not suggest exertion. It has a dexterous way of using a strong breeze to help it along. I have seen one go up the side of a two-storey house and over the roof without a flap of its wings. All it required to do, was to set itself at the proper angle and the wind did the rest. Even when they have started out upon their long journey southward, those near the ground do not reserve their strength by refraining from amusement. With many a sweep and swirl they are up and down, here and there and all around, yet never allowing themselves to fall behind the steadily advancing stream. Mr. Alexander of Her Majesty's Customs Department, Hamilton, informed me that on one occasion he was crossing Lake Erie from the American side, and that they sailed for hours through a flock of *Archippus* going in the opposite direction; and when the steamer reached Port Dover the butterflies were still going out over the lake. And from his description of their behaviour on the water, it corresponded exactly with what I have so often seen upon land; some high in the air, others skimming over the surface of the lake, or dotting the space between, whilst many found time to come on board, and investigate the mysteries of the deck.

As to its "continuous-brooded habit," I have never seen the slightest indication of such a thing in Ontario. From the time that freshly emerged specimens appear in July, to the time they depart in autumn, they never show the least regard for each other sexually. So marked is this feature of their conduct during that time, that it was asserted by some, that those great gatherings of them were composed entirely of one sex, but this was soon proved to be not the case: yet it brings to view how much that peculiarity attracted attention. Dr. Scudder claims "that no Anosia Archippus born northward ever lays eggs the same season;" and I am quite prepared to believe it. On one occasion I obtained a chrysalis of that butterfly in the latter part of October, which matured by the

6th of November. Was this an attempt at producing a second brood? Reasoning from analogy one would unhesitatingly say, yes. But from all my observations of that butterfly, I as unhesitatingly say, no It was but a retarded specimen from a more southerly born parent; and would probably not have matured in nature at all. It is no unusual thing to find dead chrysalids after frost that give no indication of being parasitised. Although Dr. Thaxter saw some of them in Florida making an attempt at producing a brood there, yet the fact that they were still in swarms, clearly indicated that their time for breeding had not yet come, or they would have been dispersed. Now then, seeing that fresh hatched specimens begin to appear here about the middle of July, and continue on the wing in increasing numbers to the beginning of September, when a great proportion of them takes their departure; and that portions of these same swarms may reach the latitude of Maryland about the end of September, Texas and Florida in October and November, that they winter along the Gulf of Mexico, or even further south, and that it will be the end of February or the beginning of March before their regular time of breeding begins, and that we have not the slightest reason to believe that they hybernate at all, anywhere, as *Antiopa* and the *Graptas* do; there seems to be a reasonable excuse for the belief that *Anosia Archippus* is a long lived butterfly, and that continuous-lived would be quite as appropriate for it, as continuous-brooded.

That any *Anosia Archippus* leaving Ontario in the autumn, will return to it in the spring to propagate its species, is a matter upon which we have no information whatever; and seems quite improbable. But that the first ones that appear here do come from the south of us, admits of no question. Yet the terms "north and south," are often used in such a loose and ill defined manner, as likely to cause confusion. Hence Mr. Tutt has tripped over my "doubtful logic," when speaking of their going south in the autumn, and returning in the spring; when it was the "species" that I meant, and not the individuals; which I ought to have made more clear.

There are but two statements that I can find, that provide any basis upon which to form a calculation as to the distance from which our first arrivals may have come. Edwards speaks from West Virginia, Riley, from Missouri. West Virginia is a long way south of Ontario; so we are not warranted in concluding that the behaviour of *Anosia Archippus* there will be identical with what it is here. Edwards in his life history of *Danais Archippus* (Psyche, Vol. ii, Dec. 1878, p. 169,) says: "In this part of West Virginia, *D. Archippus* is, I have reason to believe, four-brooded, and the butterflies of the last brood, and these alone, hibernate. The survivors appear very early in the next spring, and are always faded and more or less broken." And through that whole history, he makes his estimates upon the principle that it is a hibernating butterfly. Now the fact that Dr. Thaxter found it wintering along the Gulf of Mexico, utterly precludes the idea of its hibernating in any true sense of the word. So Mr. Edwards's "survivors" came from a good way south of West Virginia. Riley also speaks of it in the same way; which was quite excusable at that time, as facts to the contrary had not been disclosed, and they reasoned from analogy, and so the habit has been kept ever since; but we must now view it another light. Edwards's spring dates are, butterflies appear the last of March. Eggs laid the second of May, butterflies from these, thirtieth of May. Riley, 3rd annual Missouri report, p. 144, says: "They commence depositing eggs in the latitude of St. Louis during the fore part of May . . . Butterflies from these eggs begin to appear about the middle of June." These are the only observations made in the south, giving dates, that I find to estimate time and distance by. Now *Anosia Archippus* makes its appearance in Ontario about the first of June and before, according to the season. Are our first arrivals specimens that were born in either of those localities, or there-about? Certainly not from the Missouri broods. But West Virginia is the most likely direction from which our first visitors would come; and here again we see, that there is not sufficient time for the first Virginia bred specimens to make the journey to Ontario. Then whence do they come? Our only answer must be; from some broods born much further south than West Virginia.

As to "swarms going in the opposite direction," we have no spring swarms in the north. And those observed and recorded in the south, do not seem to seriously conflict with observations made in the north. The "bevy" that was seen in Texas the last day of March, containing thirty individuals, would not be considered in the north of sufficient importance to notice which way they were going. The report received by Riley from

Mr. Wells of Kansas, of a swarm which he saw in the middle of April, "that came rapidly with a strong wind from the north-west," seems to be of somewhat uncertain interpretation. But there is one thing I feel quite certain of, let Anosia Archippus, wherever, or in which ever direction it might be going, get caught in a gale it would head against it. I have seen individuals of them out in a gale that I could hardly hold against; low down, slowly but steadily making their way in the opposite direction, and that with little apparent flutter of the wings but with them closely reefed, until tired of the monotony of the procedure, or not wishing to go any further in that direction, they would suddenly shoot up and get hurled fifty or more feet in the direction they had come, then turn and go through the same performance over again. They may do the same in flocks, who can tell?

If I were undertaking to draw up a programme of the proceedings of this butterfly from my abundant lack of information; and filling in what I don't know with what I think is most likely, it would be something like this: *Anosia Archippus* is a southern butterfly, which has inherited a powerful migratory instinct, and is endowed with a capacity to indulge it to the utmost limit of its inclination. The northern portion of the American Continent, is where it finds the conditions most favourable for the multiplying of its species to an unlimited extent. But it cannot endure frost, therefore goes southerly in autumn, and with that purpose in view gathers into immense swarms before it starts out. It makes the journey in easy stages, spending months on the way. As it does not hibernate, it keeps on the move south-west until its breeding season comes round, when these, or more southerly bred specimens, start the northerly movement. Reference has been made to the habit of birds; an excellent comparison for my purpose. We know that they leave their southern residence for the north at a suitable period of the year, and by the time the species has reached its northern limit, the whole continent is uniformly stocked. No part missed, no part burdened with an over supply, and we know that the southern ones will be breeding before the northern ones have commenced building. Apply the same principle to our butterfly; only she has no building to do, and no care to take of her young, so she is not required to settle down in one locality, but may place one egg here and another there as she finds it convenient and pass on. Now I will accept and be guided by Mr. Edwards's observations in West Virginia, as to her conduct there, but not his conclusions. He says, (Psyche as previously quoted,) "The survivors (from hibernation) appear very early in the next spring, and are always faded and more or less broken (From much exposure and long travel as I believe.) They may be seen * * * the last of March; * * the females deposit their eggs the last of April and early in May on the leaves of different species of Asclepias, beginning as soon as the plants are well out of the ground, and thereafter, without doubt, soon die, after the manner of their kind." In that we learn, that our southern born butterfly was not in a condition when she reached West Virginia to oviposit. That it took a month to mature her eggs. How many of those who started out with her, spent that month in going further north, and so have reached Ontario about their usual time? A few butterflies will stock a locality with a species, if eggs are all laid together at one time; which I think is not the case with this one, hence the absence of well defined broods. And Mr. Edwards proved that they do not "soon die" after finishing egg laying by capturing one on the 2nd of June, with her ovaries quite empty. So here we have still an interesting question to settle, how long do they live before finishing, when they survive for sometime after? Again Mr. Edwards says, "every female from which I have obtained eggs in confinement, later than May, and all those which I have noticed as they were ovipositing in natural state, have been fresh colored, and evidently not long from chrysalis; (I have witnessed similar phenomena in Ontario during the first part of July.) So I have no idea that this species differs in this respect from other butterflies. One brood of *D Archippus* succeeds another the season through, the females of each brood depositing their eggs within two or three weeks after emerging from chrysalis, and soon after dying; and the last brood of the year hibernates, the females not to be impregnated till the next spring." Which would be all correct, if we were dealing with a species that goes the round of its life's history in one locality, hibernating there in winter, and producing its kind in summer, year after year as so many do. But analogy fails us here; for we have to do with a species that requires the continent for a home, ranging from a defined northern limit on the one hand, to an undefined southern extension on the other, with no apparent attachment to

a locality but what suits its present needs; seemingly conscious of its being but a transient resident anywhere; chased from the north by the approach of winter, it is compelled by a necessity of its nature to return to it in the spring. Leaving the north in united multitudes in the autumn, it returns to it by independent units in the spring; and believing that there are several broods of it in the south, and that each of them is controlled by the same strong desire to travel, which at that season means northward; and that these will follow the same route as did the previous ones, depositing eggs where some had been laid before; I get an explanation for the comparative freshness of the butterflies that are late in arriving at the north, and in the great disparity in the size of caterpillars found on the milk-weeds during the season. But where to draw the line between north and south for them, I will not undertake.

PARASITES IN THE EGGS OF CHRYSOPA.

By J. Alston Moffat, London.

On the 19th of June, 1900, whilst strolling in Victoria Park, London, my attention was arrested by an unusual looking object on the underside of a linden leaf, attached to a projecting branch a little above the level of my eyes. I plucked the leaf to closely examine it, but could not decide as to whether it was an animal or vegetable production. Afterwards remembering that I had seen an illustration somewhat resembling it, I turned it up, and found that singular object to be an egg cluster of the delicate lace-winged fly of the genus *Chrysopa*.

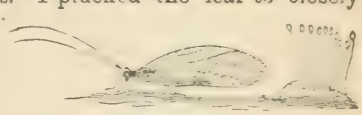


Fig. 8.

The Rev. J. G Wood, in Insects at Home, page 281, thus discoursed upon the eggs of this insect: "They are generally deposited upon leaves, but, instead of being laid directly on the leaf, every egg is fixed to the end of a slender footstalk about half an inch in length. This footstalk is formed from a viscous matter secreted by the female, and is delicately white and translucent. Mr A. G. Butler, of the British Museum, told me that he has kept lace-winged flies, and often seen them lay their eggs. The end of the abdomen is first pressed against the leaf, and a tiny drop of the viscous matter deposited. The abdomen is then raised quickly so as to draw out a thread, which becomes stiff and hard almost as soon as it comes into contact with the air. Then the insect pauses a little, and rapidly places an egg on the end of the thread, fixing it there with another drop of the secretion. The eggs are always laid in groups. . . . They bear a curious resemblance to the capsules of certain mosses, and indeed have been described and figured in books as specimens of British moss". Which is not very surprising, as they instantly suggested a moss in fruit, but much more slender than any moss that I had seen

There were thirty-four eggs in the cluster, and a single one placed on the upper side of the leaf. The eggs were about the thirtieth of an inch in length, and about as long again as they were wide. The stalks would bend to every breath, like a field of heavy laden grain before a breeze; giving the impression that they were top-heavy. I placed the leaf in a box and awaited developments. In a day or so the eggs changed colour, becoming darker, and I fancied larger. One morning on taking my accustomed view, some of the eggs had become white, and upon applying a lens I found they were empty, nothing but an extremely thin shell left with a hole in the top, out of which an insect had come. I then made diligent search to find them, when I at last discovered three tiny creatures in a depression of the leaf near the mid rib, as if they had therein sought safety and shelter. They were about three times as long as they were wide, and each armed with a pair of tremendous jaws which appeared to form quite one half their entire length; reminding me of the ant lion, to whom it is said to be related. That was my only view of them, for the next time I looked they had all disappeared. Having no Aphides to feed upon, probably the stronger devoured the weaker and then escaped from the box. Six of the eggs had matured and given forth their contents, whilst in the meantime the others had assumed a leaden hue. On the 28th of the month I was looking at them to see if there were symptoms of change, and wondering what might be the cause of their present

appearance, I observed a dark speck moving rapidly on the white paper with which the box was lined, and on examing with a lens I discovered it was a fly. It was honey-yellow in colour; its head was wide and squarish, with thorax of similar width, and abdomen tapering suddenly to a point. Its eyes were situated on the outer corners of its head, like those of a *Cicada*, dark colored and prominent. Its wings lay flat on its back, and projected half their length beyond the abdomen. It was very active, running rapidly and disappearing by flight every now and again, to reappear in another part of the box. I now turned my attention to the discolored eggs, and found several of them had holes in their sides out of which Ichneumons had escaped; and probably that fly was one of them. Upon making a closer examination all the discolored eggs had on their surface, what were in all probability Ichneumon eggs, and upon one of them I counted six. Clean-cut round holes out of which Ichneumons had escaped were found, variously located on some of the Chrysopa eggs, but in no instance had there more than one parasite matured in any one egg, and the great majority of them had not given forth any. There was abundant evidence to prove it a clear case of overdone parasitism, and that the most of the parasites had failed to mature from lack of sustenance. Many of the *Chrysopa* eggs exhibited several circular markings on their shells, as if they had been made on the inside preparatory for the escape of the fly, which had died before accomplishing it; whilst others shrunk and cracked upon drying.

A manifestation of this sort seems like a great waste of energy in nature, and a lack of intelligence on the part of the creature committing it, which is hardly in accord with the theories promulgated by some writers about the forethought exercised by forms of life, for the progress and improvement of their kind. In this instance we see merely a female ichneumon, constrained by the controlling impulse of her nature to deposit her eggs. Having found a cluster that answered her purpose, she fulfilled her mission regardless of consequences; and whilst she overlooked some of the eggs, she deposited far too many upon others, which came very near exterminating a whole brood of this useful insect; whilst at the same time she nearly extinguished the life of her own offspring. Therein giving us a fine illustration of how the works of nature are carried on under an established government by law; when each individual is strictly following the controlling impulses of its own nature, and yet is not prevented from taking a departure from routine in case of an emergency.

THE DRAGON-FLIES OF THE PROVINCE OF QUEBEC.

By Rev. T. W. Fyles, D.C.L., F.L.S.

Among the most beautiful of the insect tribes are the dragon-flies. The imposing size of many of the species, the brilliant colouring of their eyes and bodies, their wide-spreading, closely-reticulated wings, the rapidity of their flight, the dash and *elan* of their approach, the rustle of their wings as they sweep around, fill the intruder upon their haunts with admiration.

This admiration is increased when an opportunity is afforded for a close examination of one of these remarkable objects. The head of the insect seems to be made up mainly of eyes and mouth. The innumerable facets of the protruding, compound eyes glow with prismatic hues. In Æschnidæ and Libellulidæ these eyes are contiguous, and there is but a very small space between them and the mouth organs; but in this small space there are three ocelli or single eyes. The dragon fly can see above and below, behind and before. It detects every motion of its enemy or its prey, and its powers of flight enable it to escape from an assailant and overtake a fugitive.

The mouth of the dragon fly is furnished with two large flat lips, which work up and down, and enclose the mandibles and maxillæ like a visor. When the creature is feeding this motion of the lips would lead one to think that the jaws move vertically, instead of horizontally, as is really the case.

Besides its powers of sight and its formidable mouth-organs, the dragon-fly has an advantage which many other insects have not—its head moves freely on its neck. It can turn its head half way round. Woe to the unhappy insect that comes in the way of so formidable a spoiler!

The thorax of the dragon-fly is capacious and somewhat barrel shaped. It contains

the powerful muscles necessary to move and control the four ample wings and the six legs of the creature.

The abdomen extends far behind, to steady the insect, and to aid in steering its flight; but in the Libellulidæ it is somewhat flattened and ends with a point. In *Corduligaster* the cylindrical abdomen ends with a knob or swelling, hence the name, a club, a paunch. In *Gomphus* the abdomen is spatulate at the end.

July and August are the months in which the dragon-flies abound. Then every pool, every stream, is frequented by them. Sometimes the observer may see them in the act of depositing their eggs. They alight upon the flags, arrowheads and other aquatic plants, and taking suitable positions dip their abdomens into the water, and deposit their eggs in masses upon the stalks and leaves beneath the surface.

The embryos, in different stages of their growth, have been observed and figured, and the larvæ of various kinds are known. To the possessor of an aquarium the study of the habits of the dragon-fly, in its early stages, would afford great pleasure.

A dragon-fly larva is a wonderful thing. At first sight the uninstructed observer does not see much to admire in it, but closer examination reveals features of exceeding interest. One of these is the extraordinary under lip of the creature, which takes the form of a jointed arm, furnished at the extremity with nippers for securing its prey. When not in use this instrument is neatly folded under the throat of the larva—it is called "the mask" (Fig 9). Then too, the peculiar arrangements by which the insect obtains oxygen, its vital breath, from the water, are worthy of notice. It has no head gills, as the fish has; no branchiæ like the larva of the Horned Corydalis; no breathing tube like that of the rat-tailed maggot of Eristalis. The respiratory organs lie within the abdomen, and the water is admitted to them through an orifice furnished with five angulated plates, which open or close as need requires. Ordinarily the process of the alternate admission and expulsion of the water goes on with easy regularity; but when the creature is alarmed or stimulated by the sight of its prey, the water within its body is expelled with sudden force, and the tiny current, impinging upon the inert volume around, sends the insect forward with a rush, as the rocket is sent through the air by the pressure of the gases suddenly generated by the combustion of the materials with which the case is filled.

Fig. 9.—The left figure represents the larva with its protruded lip in the act of seizing its prey; the right shows the perfect insect emerging from its pupal case.

The metamorphoses of the dragon-fly are incomplete. At the pupal change the insect does not become quiescent, nor does it cease to feed—it retains its active habits and voracious appetite. When the time comes for it to assume the imago state, it climbs some plant or other object till it is clear above the surface, and then its skin bursts along the thorax and the perfect insect crawls out of the opening and leaves its old habit, attached by the claws, as a memorial of its former state. (See Fig. 9.)

Having thus introduced the Odonata, and given some glimpses of their habits, we will now notice their classification.

They are divided into four families: AGRIONIDÆ, GOMPHIDÆ, ÆSCHNIDÆ, and LIBELLULIDÆ. These are easily distinguished each from the others.

The Agrionidæ have the eyes wide apart and placed apparently on pedicels.

The Gomphidæ have large eyes, near together, *but not touching each other.*

The Æschnidæ and Libellulidæ have eyes that are contiguous. In the former *the labial palpi have three joints*; in the latter the joints of the labial palpi *number only two*

The following is a list of the Dragon flies accredited to the Province of Quebec :

AGRIONIDES.
- Calopteryx, Leach.
  - *Splendens*, Selys.
  - *Virginica*, Drury.
  - *Maculata*, Beauv.
- Lestes, Leach.
  - *Unguiculata*, Hagen.
- Agrion, Fab.
  - *Hageni*, Walsh.
  - *Ramburii*, Selys.
  - *Iners*, Hagen.
  - *Positum*, Hagen.
  - *Saucium*, Burm.
  - *Civile*, Hagen.
  - *Durum*, Hagen.

GOMPHIDES.
- Gomphus, Leach.
  - *Vastus*, Walsh.
  - *Fluvialis*, Walsh.
  - *Fraternus*, Say.
  - *Exilis*, Selys.
  - *Spinosus*, Selys.
  - *Rupensulensis*, Walsh.
  - *Colubrinus*, Selys.
- Corduligaster, Leach.
  - *Lateralis*, Scudder.
  - *Obliquus*, Say.
- Petalura, Leach.
  - *Thoreyi*, Hagen.

ÆSCHNIDES.
- Anax, Leach.
  - *Junius*, Drury.
- Æschna, Fab.
  - *Constricta*, Say.
  - *Vinosa*, Say.
  - *Verticalis*, Hagen
  - *Heros*, Fabr.
  - *Janata*, Say.
  - *Septentrionalis*, Ramb.

LIBELLULIDES.
- Macromia, Ramb.
  - *Transversa*, Say.
  - *Illinoisensis*, Walsh.
- Epitheca, Charp.
  - *Yamaskanensis*, Prov.
  - *Forcipata*, Scudder.
  - *Princeps*, Hagen.
  - *Elongata*, Scudder.
  - *Albicincta*, Burm.
  - *Linearis*, Hagen.
- Cordulia, Leach.
  - *Uhleri*, Selys.
  - *Lateralis*, Burm.
- Plathemis, Hagen.
  - *Trimaculata*, De Geer.
  - *Subornata*, Hagen.
- Libellula, Linneus.
  - *Quadrimacula*, Linn.
  - *Pulchella*, Drury.
  - *Exusta*, Say.
- Diplax, Charp.
  - *Rubicundula*, Say.
  - *Scotica*, Donovan.
  - *Hudsonica*, Selys.
  - *Intacta*, Hagen.

Many of these species are reported to have been taken on the Yamaska River.

Space would fail me to give particulars of all these species. Their acquaintance can be made by degrees. But a few words on the appearances of some of the most common and most noteworthy species may be acceptable.

First then, the beautiful "Demoiselles" (as the French call them) will be readily brought to mind They may be found, in their season, on the banks of all our streams, and they are particularly abundant along the brook that crosses the road at St. David. These insects of the genus Calopteryx have wide-spreading equal wings, and long, slender, stainy and deep green bodies.

Much smaller, but equally beautiful, are the various species of Agrion. They frequent our quiet pools, and flit with ease and grace, from tuft to tuft of the herbage that abounds in their favourite haunts. *A. saucium* is bright red, like sealing wax. *A. civile* is a beautiful blue—one might fancy that it was a thread fallen from the mantle of the summer sky.

One of our most common dragon-flies is *Gomphus vastus*. It may be known by its black and yellow livery, and by the remarkable widening out of the three abdominal segments immediately before the last. This species abounds in the woods around Fort No. 2, Levis. I have no doubt that its larvæ may be found in "Mer de-Papon" and other pools in that neighbourhood.

The Æschnidæ are large and handsome insects. The rarest of them in these parts is *Anax junius*. I saw a pair of these sporting over a sheet of water near Spruce cliff last season, but they were careful never to come within reach. Æschna septentrionalis is often met with. It is that large black and bright blue dragon fly with hyaline wings of a faintly green cast—the stigmata being long and brown. I always look upon this as the typical dragon-fly, "the Devil's darning-needle, the "Horse-stinger" so dreaded by children. I need not say that it is quite incapable of injuring either horse or man.

The species of the genus Libellula are all handsome insects. Their abdomens are dagger shaped, ridged down the middle, sloping to an edge on either side and pointed at the extremity. The female of *Trimaculata* has three brown patches on each of its wings —one patch at the base, one in the centre, and one at the tip. The spaces between are clear. The male (Fig. 10) has a patch at the base of each wing, but the tip of each is clear, and there is a large brown patch in the centre extending from the costa to the inner margin. The abdomen of the male is of a bluish white, as if it had been painted. A much larger and more beautiful insect is *Pulchella*. This also has three patches on each wing, but of a richer brown than in the last instance, and the spaces between the patches are clear white. *Quadrimaculata* is another very beautiful insect in this genus. It may be known by the golden yellow streak, and the two rich brown spots on each wing, and the angulated patch at the base of the secondaries. The abdomen of this handsome insect is brown, and has a row of yellow spots on either side. Quadrimaculata is found in Europe as well as in America. It was named by Linneus. It is very plentiful at the "Gomin." It breeds, no doubt, in the pools that lie to the south of the swamp.

Fig. 10.

Of the genus Diplax, *rubicundula* seems the most common of our species. It abounds on the Chaudiere River. Insects of this genus may be readily known by their smaller size, their awl-shaped abdomens, and the very distinct stigmata of their hyaline wings. (Fig. 11 is the male of Diplax Berenice; Fig. 12 the female; Fig. 13 Diplax Elisa).

Fig. 11.

Fig. 12.

And now it may be asked, what useful purpose do the dragon-flies serve in the economy of Nature? We will take the liberty of meeting this question with one or two more. Did you ever go into the woods when the mosquitos were in strength, and thirsty for blood? Did you ever sail on one of our rivers —the Ottawa for example—when the shad flies covered every inch above the tide of the vessel you were in? If you have, you will have said to yourself, if not to others, what a nuisance these things are! Now the dragon-fly spends the whole of its existence in the endeavour to keep down the numbers of such pests as these. It is a sportsman ever on the watch for its game, and when this comes in view it pursues it with energy and success. If it were not for the dragon-flies and other predacious tribes the troublesome insects would increase to an intolerable extent.

Fig. 13.

THURSDAY, NOVEMBER 15TH, 1900.

The Entomological Society resumed its sessions at 11 a.m, the President, Rev. Dr. Fyles, in the chair. After the reading of a paper by Mr. Henry H. Lyman, of Montreal, on "Specimens of Spilosoma Congrua, Walker, and kindred species in the British Museum," the meeting proceeded to the election of officers for the ensuing year, which resulted as on page two.

A number of papers were then read, followed by brief discussions in each case. After an intermission for lunch the meeting continued till five o'clock p.m., when the members from a distance left to catch their respective trains. Votes of thanks were adopted to Dr. Fletcher, Mr. H. Hague Harrington, and Mr. C. H. Young, of Ottawa, for their kind donations of rare specimens to the society's collection. Letters of apology for non-attendance were received from Dr. Wm. Saunders and Mr. Harrington, Ottawa; Mr. J. D. Evans, Trenton, and Mr. D. G. Cox, Toronto.

A large case of rare Lepidoptera was exhibited by Dr. Fletcher, special mention being made of many of the specimens. These had all been taken in Canada, mostly during the past year, and those of which special mention was made are the following:

Papilio Brucei. A specimen of this rare butterfly was taken at Regina by Mr. T. N. Willing, and along side of it was shown a bred specimen which Dr. Fletcher received from Mr. W H Edwards This Dr. Fletcher believed to be the first record of this insect having been taken in Canada, although it is mentioned in a list received from Mr. J. W. Cockle, of insects he has taken at Kaslo in the Kootenay mountains.

Vanessa Californica. Some beautiful bred specimens were exhibited, pupæ of which had been sent from Kaslo by Mr. Cockle. This is a seasonal insect which is usually rare but occasionally very abundant.

Attacus Ceanothi. A specimen of the moth bred from cocoons received from Mr. E. W. Haines, who formerly took a female at New Westminster, B.C. and has since bred two broods of the species in confinement in England. A fine series of inflated larvae showing every stage was also exhibited.

Memythrus (Sciapteron) *tricinctus* bred from cotton-wood twigs sent from Cotton-wood, N.W.T.

A fine series of Arctians, including a beautiful series of *Arctia phalerata* with inflated larvae in all stages, which were described in full in a paper by Mr. Arthur Gibson, *A. Caja*, var *Americana, parthenos, Parthenice, Yarrowi*, from Hudson Bay, *determinata, vittata, Anna, figurata, Williamsi, Blakei*, etc, were shown.

Colias Eurytheme. Some interesting specimens of this species showing all the recognized forms and all collected at Ottawa, were shown. This has been one of the characteristic insects of the year and has been unusually abundant throughout Ontario.

Terias Lisa A nice female taken at Ottawa by Mr. Gibson on the 18th Oct

Pseudolimacodes littera. A fine specimen of this pretty little moth, also taken at Ottawa by Mr. Gibson was shown.

Thecla Damon. A specimen taken at Picton on the 24th May last, by Dr. Fletcher.

Pieris rapae. An interesting series showing many variations was exhibited including the buff female, and the very rare yellow female, the variety *novangliae.* The males of this variety are not uncommon, but the female is extremely rare. Dr. Scudder mentions that Curtis took a yellow female in England many years ago, and there are doubtless others but they are not recorded. Taken at Ottawa by Mr. Gibson, 18th Sept.

Peridroma saucia and *Noctua C nigrum.* These were the two devastating cut-worms of the year. The former throughout the Province of British Columbia and the latter in Central Ontario. Beautifully inflated larvae in the last two or three stages were exhibited, with the moths

Pamphila Zabulon and *P. Hobomok* were shown in both sexes and the differences pointed out. It was claimed that these were distinct species and that *Hobomok* was probably the only one that occurred in Canada. The members were asked to be on the lookout for specimens of *Hobomok* which had not the veins darkened where they crossed the yellow colour of the disc. If they found one it would probably be the true *Zabulon. Zabulon* has no yellow female, but *Hobomok* has both a yellow female and a black female variety, which is called *Pocohontas.*

Euptoieta claudia bred from violets from Kinistino, N.W.T. Butterfly, larva, and pupa.

Pyrameis carye, butterfly pupa and larva. The larvae of this species were found by Mr T. N. Willing feeding on Nettle at Regina.

Cacœcia parallela. Larva, pupa and moths. A troublesome pest in a greenhouse at Hamilton.

Anacampsis lupinella. A new species of tineid bred from lupin collected at Toronto. Larva, pupa and moths.

The following specimens of insects were kindly presented to the Society by Dr. Fletcher:

Vanessa Californica,
Plusia rectangulum,
Plusia mortuorum,
Xylina contenta,
Lithomia germana,
Arctia phalerata,
Culex pungens,
Culex stimulans,
Anopheles quadrimaculatus,
Anopheles punctipennis,
Anthophilax malachiticus,
Arctia Williamsi.

A beautiful collection of inflated larvae was exhibited by Mr. Gibson. These had been collected during the past summer and showed several of the species in all their moults.

A fine case of rare moths taken at Ottawa was sent for exhibition by Mr. C. H. Young, of Ottawa, who kindly presented the Society with a beautiful pair of *Plusia aereoides*.

A box containing twelve species of rare *Proctotrypidae* not in the collection of the Society was presented by Mr. W. H. Harrington, of Ottawa.

THE SILKWORM INDUSTRY IN ONTARIO.

By Prof. W. Lochhead, Ontario Agricultural College, Guelph.

The purpose of this article is to answer the question: Is a silkworm industry possible in Ontario? This question has been asked frequently during the past season, and invariably by persons residing in the county of Essex. The question is a very important one, for if the conditions be favourable for the establishment of such an industry considerable additional revenue would soon flow into the county, and enrich those engaged in the industry.

The various factors bearing on the successful establishment of a silkworm industry will be briefly considered.

During the past season Rev. W. M. Fleming, of Essex, reared a large number of silkworms from eggs, and had remarkable success in the production of silk cocoons. So gratified was he with his success that he naturally began to ask himself the question: Why cannot a silkworm industry be established in this country? In letters to the Department of Agriculture he advocated the breeding of silkworms as an industry which might be carried on very profitably by persons in poor circumstances, who had no regular employment, where the women and children could attend to the feeding and care of the worms.

The writer had occasion recently to visit Essex, when he made a point of inquiring into the silkworm conditions of the locality. Several prominent persons of business persuaded by the success of Mr. Fleming were of the opinion that cocoons could be produced in paying quantities, and were anxious to try further experiments next season. Moreover, many persons, uninformed as to the market conditions, felt that the Government should start a series of experiments to determine the feasibility of the whole project, and give aid in the form of a bonus.

The conditions necessary for profitable production of raw silk are: 1. Cheap labor, and many laborers. The chief silk-producing countries are those bordering on the Medi-

terranean, and in the far East where labor is very cheap. Experience, moreover, has shown that many laborers are required to provide food for the silk worms during the last ten days, just prior to the spinning of the cocoons. 2. Suitable food-plants upon which the worms may live and grow. The mulberry leaves are the staple article of diet in Europe and Asia, but in the United States it has been shown that the leaves of osage orange form just as good a diet as the leaves of mulberry. 3. Suitable climatic conditions of temperature and moisture. Experience again has shown that the silkworms may grow well in many countries, and slight changes of temperature do not affect their well being to any appreciable extent, although of course they thrive best in warm, semi-tropical countries. 4. A ready market for the cocoons, or rather the reeled silk. Here again the cheaper labor of the Old World tells against the development of silk industry in this country, and to sell the reeled silk in France or Italy means such a great reduction in profits that our people could not compete.

On inquiry in Essex regarding the extent to which the county could fulfil the foregoing conditions, the writer learned that the labour was to be done chiefly by the women and children, and only during the last few days would extra help be required. Skilled help would be secured at this critical period, for many factors enter into operation during the last few days which are of vital importance in successful rearing. The worms are ravenous, and the amount of food consumed is simply marvellous. Fresh leaves must be secured and given regularly so that the worms may feed continously. When the food-plants are not close by, the task of feeding many thousands of worms becomes too heavy for women and children, and extra help must be obtained. Again, the worms must be carefully watched at the time of spinning the cocoons to prevent two worms forming one united cocoon, as is often the case where the worms are kept too crowded Then, again, the cocoons must be secured and the enclosed pupae killed within the cocoons. The best method of killing the pupae is to place the cocoons in an oven heated to about 194 degrees F. All this work involves care, and if the silk growers procure their own supplies of silkworm eggs for the following season some additional care is necessary. The moths are allowed to escape from the cocoons which they usually do about two weeks after the spining of the cocoons.

Essex county is fortunate in having a mild climate, one in which the mulberry and osage orange trees grow quite readily. Both the Russian and the native species are common, and two or three years would suffice to grow mulberry trees of such a size as to feed the silkworms of a large industry. Osage orange trees, too, are very abundant, and miles of hedges can be seen by driving along the roads of central Essex.

Through the kindness of Director Stupart, of the Meteorological Office, Toronto, the writer is able to give a comparison of mean temperatures of Essex county and Central France, the great silk-producing region of France. The mean temperatures for the months of April, May, June, and July are given below :

	Claremont, France.	Moulins, France.	Windsor, Ontario.
April	51.1	50.0	45.7
May	56.1	56.8	58.0
June	62.2	63.1	67.7
July	66.6	67.6	68.5

During the last week of May and the whole of June the silkworms are feeding, and by the first week of July the cocoons have been spun. From the table presented above it will be seen that the temperature of Essex differs but a little from that of Central France during the critical period.

The practical experiments carried on by the United States Department of Agriculture from 1884 to 1891 show conclusively that a most excellent quality of silkworm cocoons could be raised over most of the United States; and Dr. Howard, U. S. Entomologist, states as his opinion that the silkworm could without doubt be grown successfully in lower Ontario ; but the absence of a home market for the cocoons puts the industry for the present out of the region of possibility. There are no establishments in the United States for reeling silk from the cocoons. No person could be induced to start reeling establishments for the reason that "no silk reeler could afford to pay a price for cocoons which would induce even the poorest of our citizens (or even non-producing mem-

bers of the family) to undertake the more or less arduous labors of raising worms. It was found impossible to convert the cocoons into raw silk, namely, to reel them in this country in competition with the cheap labor in foreign silk-producing countries."

In 1890 it was shown that even with the introduction of improved automatic, electric silk-reels it was impossible to compete with Europe and Asia without the imposition of a customs duty of not less than $1 per pound on reeled silk imported into the United States.

A few facts regarding the weight of silk-moth eggs and cocoons may be interesting to persons who intend experimenting with silkworms. One ounce of eggs contains about 40,000 eggs (in France a family usually undertakes to rear this quantity). From these are obtained from 80 to 120 pounds of cocoons, which yield from 11 to 17 pounds of reeled silk. About 300 medium-sized cocoons weigh one pound, while the silk reeled from these weighs about one-eighth of a pound. In other words, 2,500 medium-sized cocoons will yield one pound of reeled silk.

The life-history of the silkworm (*Bombyx mori*) is very instructive and interesting. Each female moth lays nearly 500 eggs in a cluster soon after she emerges from the cocoon about the first or second week in July. The fertilized eggs are drab-colored, while the unfertilized ones are white or grey. The young worm on its first appearance is nearly black, covered with stiff hairs, and is about one-eighth of an inch in length. It becomes full grown in about twenty-eight days, during which time it has moulted four times, becoming lighter in color with every moult. When mature it is creamy white, has a prominent projection on the dorsal surface near the end of the abdomen, and is two or three inches long. The spinning of the cocoon occupies nearly three days. The threads of silk are viscid for a few days and consist of two fibres secreted by two glands which run along the sides of the body and open together on the under lip of the worm. This double thread is said to be about 4,000 yards in length.

The pupa moults once within the cocoon, the skin of the first moult usually remaining attached to the inner surface of the cocoon. The color of the cocoon may be white, or yellow, or orange, and investigations fail to reveal the cause of the variation in color. In four or five days after the cocoon is made the silk is ripe, when the pupa may be killed by heating the cocoon to a temperature of 194 degrees F. in an oven as already mentioned. If the moth is allowed to escape one end of the cocoon is broken, thereby injuring the continuity and excellence of the silk threads.

The moth is whitish or cream-colored; its fore-wings are falcate, with one or two brownish lines crossing the wing. The moths are not inclined to fly much, and are easily kept in confinement until the eggs are laid. There is but one brood a year, but the greater part of the year is spent in the egg state. The active period covers little more than six weeks, of which four weeks are spent as worms.

Concluding, the present market condition for reeled silk precludes the possibility of the establishment of a silkworm industry in Ontario, and "serious disappointment will surely follow exaggerated ideas upon the subject of silk-raising for profit, and if any person is contemplating such a course he is very strongly dissuaded therefrom."

Dr. Fletcher spoke of the interesting character of the paper and said that the Government at Washington had given up its experiments with silkworms because the French manufacturers would not pay for the cocoons a price that would remunerate American labor. In France they kept the eggs in a cool place so that they might not hatch till the mulberry trees were in leaf; if they should hatch too soon they could be fed upon lettuce, but this food was not safe, as it often produced diarrhœa in the caterpillars. He referred to the fact that most schoolboys in England reared silkworms for amusement, and in consequence a very large number became deeply interested in entomology.

RESULTS OF SOME APPLICATIONS OF CRUDE PETROLEUM TO ORCHARD TREES.

By F. M. Webster, Wooster, O.

The varying and sometimes disastrous results obtained from the use of refined petroleum, on growing trees, as an insecticide, and especially against the San José scale, has led to the suspicion that the crude product might be less variable and drastic in its effects.

But so far as it has been used it would appear that we have yet much to learn, before we can, with safety, recommend the application of the crude product to the different varieties of fruit trees. That it is efficient in destroying the San José scale, if it is brought in contact with this insect, seems now quite probable. But the hundreds of dead trees that mark the areas where it has been ind scriminately used, point very clearly to the fact that great caution is necessary, and no one is, as yet, able to say just where safety ceases and danger begins Then, too, when no permanent injury is apparent, as in the case of the seedling apples on the grounds of the Ohio Agricultural Experiment Station, at Wooster, Ohio, who can say that this unnatural retardation may not, after the first application prove to be a menace to the life or general vigor of the trees? It is well known that, in nature, these retardations sometimes occur, but nature seldom, or never, covers the bark of a tree or a shrub, and then only in part, with vegetable growths like lichens, and even these are known to be detrimental, a smooth, clean bark being always desirable.

In the use of refined petroleum, one of the most perplexing phenomena observed was the fact that, equally careful applications, made by the same person, with the same grade of oil, would give almost opposite results. Hence, recommendation of the refined product for general use has, in many cases, resulted disastrously and brought no little disrepute to the entomological fraternity of this country. The most that can now be said for the refined product is that a ten to twenty per cent mixture with water constitutes a fairly successful summer wash and destroys the young scale, thereby checking the increase and spread until applications of whale oil soap mixtures can be made.

In the use of the crude product, I have seen some of the most astonishing results obtained, but, as with the refined, I have seen also the most disastrous effects. Perhaps the uncertainty of effects in using crude petroleum in the orchard may be best illustrated by giving the results obtained, this year, by Mr. N. A. Hadden, of Catawba Island. Mr. Hadden used crude petroleum on the strength of recommendations from New Jersey, including those published by Prof. John B. Smith, and contrary to the advice of some of his neighbors. As I knew nothing of the matter until some weeks after the latest applications, nothing could have been said or done by me to in any manner influence Mr. Hadden, who followed his own course, and, I may add, has offered me every facility for observing the final results.

About 50 peach trees of the Crawford's late variety were sprayed March 10, 1900, with 100 per cent crude petroleum from an oil well near Gypsum, Ottawa County: Distillation B. The spraying was carefully done and none of the petroleum was allowed to run down the trunks of the trees. The effect on these trees was to kill every one of them. Two other blocks of peach trees on which crude petroleum from the same well was used, were also totally destroyed. On the same day, March 10, 1900, six plum and one peach tree were sprayed with crude petroleum from the same well and of same strength. Two unhealthy plum trees died; the other four were uninjured, as was also the peach, which not only made a vigorous growth but bore several peaches. Several rows of Smock and Salway peaches were sprayed April 7th with 100 per cent. crude petroleum, and, though not showing serious injury on May 16th, in July 90 per cent were dead and the remainder fatally injured. Crawford's Late, sprayed March 8th with 10 per cent. crude petroleum, and another block sprayed with a 40 per cent. mixture, were not seemingly injured, but bore no fruit. Eight apple trees and several peach trees, sprayed March 8th with 10 per cent. crude petroleum, were uninjured.

On the premises of C. W. Shoemaker, at Waterville, Ohio, there stands a Wilder Early pear tree, that for several years was badly affected with the Scurfy Bark louse. The tree was stunted and made little growth each year. Two or three years prior to 1900 the tree was sprayed in spring with kerosene emulsion, which killed many of the insects, and the tree afterwards made a better growth than it had previously done. April 2nd, 1900, this tree was painted with crude petroleum, the analysis of which I have not been able to secure On August 17th, 1900, I saw the tree, and the bark still gave good evidence, by its colour and shining appearance, of the presence of the petroleum. The growth has been vigorous and the foliage was of the most healthy colour. The Bark-louse seemed to have been quite exterminated.

On March 23rd, 1900, a row of three year old seedling apple trees, on the Station grounds near Wooster, was treated with crude petroleum of different strengths, applied with a Deming kerosene attachment, the applications being made by two of my assist

ants, Messrs. Newell and Roulebush. This petroleum was taken directly from oil wells at Lodi, Southern Medina county and its chemical composition is shown in "analysis A." Different trees were sprayed with different strengths of the oil, varying from 10 per cent. crude pretroleum and 90 per cent. water, up to 100 per cent. crude petroleum. In no instance were the trees permanently injured. The effect was simply to retard the development of the foliage, until about the middle of May. May 7, many varieties of apples were in full bloom. The Winesap and Rome Beauty were showing their first unfolding blossoms. Strangely enough, the effect was rather more marked where the 10 per cent. solution was used. Where we used the 40 per cent. the retardation was less than where we used the 20 and 50 per cent. crude petroleum; the effect of the 40 per cent. being about the same as the 100 per cent. The 30 per cent. was almost the same in its effects as the 10 and 100 per cent. mixtures. June 13th, an examination of the trees showed that the normal amount of foliage had been put forth, and the leaves were exceedingly healthy in appearance and seemed larger than those on the unsprayed trees. An examination of the trees the middle of October showed that the first sprayed trees were really holding their foliage better than the unsprayed. Nearly all of the leaves had dropped from the latter while scarcely any had fallen from the sprayed trees. The tree sprayed with the 100 per cent. crude petroleum seemed to have held its foliage better, and the colour was more fresh and vigorous than on those sprayed with the diluted petroleum.

While all this indicates that crude petroleum may be used once upon apple with a strong probability of no detrimental results occurring from its use, nevertheless, the question is yet to be settled as to whether one or more additional applications will result in the same way. It seems to me that this whole matter has not yet reached the point where we will be justified in saying to the public it will be safe to use the crude petroleum. The practical question is not whether an expert can use this as an insecticide with safety, but whether it can be safely trusted in the hands of inexperienced men who are not trained in exactness of methods or quantities. I do not wish to be understood as in the least denying that there may be something in both crude and refined petroleum that may, in the future, have great value as an insecticide, but that, for the present, we should be content with investigations, and be exceedingly cautious in regard to recommendations until we have at least found out the reason for such widely diverse results being obtained from applications so nearly alike in point of materials and methods.

It must be remembered that our experiments with crude petroleum at Wooster, Ohio, were made upon seedling apple trees, which, though they might have possessed different degrees of resistibility, might, on the other hand, have been less susceptible than any of the grafted varieties. The selection of these trees was not a matter of choice, for they were the only ones available at the time. Next year, we shall endeavour to reverse the experiment; that is, where the 10 per cent. mixture was used this year we shall use 100 per cent. next year, and vice versa. A large number of experiments are also to be carried out upon different varieties of apple, in different parts of the State, using different strengths of the crude petroleum.

PETROLEUM DISTILLATIONS.

	A	B
Specific Gravity	35°B	34°B
Light Naptha, 80°C	1.49%	.14%
Heavy " 80° to 120°C	4 35	1.63
Benzine, 120° to 150°C	5.03	3.82
Light burning oil, 150° to 200°C	7.64	13 48
Heavy burning oil, 200° to 250°C	13.54	12.03
Residue from 250° Dist	68.70	68.62
	100.74%	99.72

A, from Lodi, Ohio, well. B, from Gypsum, Ohio.
Distillations by J. W. Ames, Asst. Chemist, O.A.E S.
B contains sulphur compounds.

INJURIOUS INSECTS IN ONTARIO DURING 1900.

By Dr. James Fletcher, Dominion Entomologist, Ottawa.

The practical entomologist has had his hands full during the past season in Ontario. The season has been a most unusual one—hot and dry in some sections, but unusually wet in others. There have not been, however, any very remarkable outbreaks of injurious insects which have been the cause of widespread loss; but some of the old and well known pests have done a considerable amount of harm, much of which could have been prevented if farmers would only recognize that they have every year to reckon with the generally forgotten but always present tax collectors belonging to the insect world and that these always work in the same way. Orchard insects, which could have been controlled by spraying, were neglected in many places, and Cutworms caused losses which could have been prevented. The Pea Weevil, every year abundant and destructive, seems this year to have been more so than usual, but the Destructive Pea Aphis was not so injurious as at one time it was feared it would be. Late in the season it was found that great harm was being done by the Hessian Fly throughout western Ontario, most particularly in early sown wheat. The Turnip Aphis was only locally prevalent. The San José Scale has spread over many orchards which were only slightly affected in the beginning of the season. The so-called Buffalo Moth is becoming a serious pest and is spreading.

Cereals.

By far the most serious outbreak among cereals was by the Hessian Fly (*Cecidomyia destructor*, Say, Fig 14, highly magnified) in fall wheat. Specimens of young wheat plants infested to a remarkable degree, some of the shoots containing nearly a dozen puparia, were received from Waterford, Ferguson, and other places. Very few reports of injury by the summer brood came to hand, so that this sudden appearance of the insect in such large numbers was somewhat of a surprise. Reports from correspondents show that late sown grain was to a marked degree less infested than that sown at the usual time in the beginning of September. The appearance of the perfect insects,—tiny blackish gnats not expanding more than a quarter of an inch from tip to tip of the outspread wings,—and the life history are so well known that it is not necessary again to go into details here with regard to these; suffice it to say that there are two broods in the year, the perfect flies of the first appearing in May and June, and laying their eggs on the leaves of the growing wheat plant. The small maggots work their way down inside the sheaths of the leaves and attack the tissues of the growing stem, weakening it and frequently causing it to fall down, bending over just above the point of attack. The brown flax-seed-like puparia may frequently be found in straw or under the machine at the time of threshing. Some of these flax seeds the number varying according to the season, produce the flies the same autumn, chiefly in the month of September; these lay their eggs on the newly sown fall wheat. Some of the flies of the summer brood, however, do not emerge until the following spring—at the same time as the flies of the autumn brood—and these lay their eggs on the young plants of spring wheat. This attack is frequently overlooked, owing to the fact that, if the wheat plants are not sufficiently advanced for the eggs to be laid upon the stem leaves, they are laid upon leaves close to the ground and the larvæ attack the root shoots and kill them before they have produced stems at all. I find that, as a general thing, there is a great deal more injury done in this way than on the stems of wheat. Farmers, as a rule with this attack, do not recognize their enemy and attribute the thin crop to "cold or wet springs," "late frosts," "hot suns," or other imaginary causes of which no exact record had been kept. As stated above, there is this autumn a very serious attack by the Hessian Fly in our Ontario wheat fields, particularly in those sections where fall wheat is most largely grown. As a matter of fact, fall wheat can be grown in every county of the Province, and the Hessian Fly is liable to occur in any of these. Certain areas, however, from the

Fig. 14.—Hessian Fly.

satisfactory results are recognized to be particularly well suited for the cultivation of this cereal.

Many experiments by agriculturists have shown that better crops are reaped if the seed is sown early, that is, about the 1st of September. This, however, is only true in such years as the Hessian Fly is not prevalent. Therefore, it is decidedly advisable for growers of fall wheat to remember in such periods as the Hessian Fly is abundant, what the life-history of this insect is, and, instead of trying to sow their fall wheat seed by the 1st of September, delay this operation until after the 20th, being content to get a slightly smaller yield and to be sure of it, than, in the effort to get a bigger crop, perhaps run the risk of losing half or even the whole from the attacks of the Hessian Fly. By postponing seeding until the end of September, the appearance of the young plants above the ground is delayed until after the egg-laying flies of the second brood are dead. Where fall wheat has been sown in August and is already well up, it is considered advisable when the Hessian Fly is known to be prevalent to feed off a good deal of the green top with sheep during the month of September, in which manner it is claimed that many of the eggs are destroyed. Care must be taken that the fields are not cropped too closely nor too late in the season. Late sowing therefore may be claimed to be the most important preventive remedy against the Hessian Fly. There are, however, other methods of reducing the numbers of this insect, among the more important of which are the treatment of stubble and the burning of refuse. The treatment of stubble is of most use in such districts as Manitoba, where there is only one brood of the Hessian Fly, which is restricted to spring-sown grain. In 1899 the Hessian Fly appeared for the first time in Manitoba, where no fall wheat is grown, and did an enormous amount of harm. Fortunately, this year there is no recurrence of this attack. The insect passes the winter in Manitoba, for the most part, in the stubble, although some of the puparia are carried from the field with the straw. Therefore, if stubbles be burnt over or ploughed down deeply in autumn and the straw is fed to stock or burnt at any time before the flies emerge in spring, there being no autumn brood, this pest should not be difficult to control. The burning of refuse which is thrown down beneath the threshing machine, will also dispose of many flax-seeds of the summer brood which did not emerge in the autumn and were carried in the straw. If this refuse were not destroyed, these would give forth their flies the following spring.

In cases where fields are found to be infested with Hessian Fly, it is sometimes difficult to decide what a farmer's wisest course is. If the infestation is only light, it is sometimes possible to stimulate the crop by the use of a light application of some quick acting fertilizer. Where, as is generally the case, there are patches in the field which have been destroyed, it is desirable to save such parts of the field as are uninjured. These patches can be sown in spring to some crop which will not require cultivation, e.g. an early ripening barley, which can be cut at the same time as the fall wheat and the whole threshed as mixed feed If, however, it is necessary to save the wheat separately, peas may be sown on these patches, which can either be cut after the wheat, or the grain can be separated after threshing. In cases of bad infestation it would sometimes pay better to use the land at once for some other crop.

The usual practice of simply cultivating deeply so as to produce a good seed bed is an improper one, because the flax seeds are present and, if the land is only cultivated, the flies will emerge in spring and prove a source of infestation to the uninjured remainder of the wheat crop and also to any spring wheat or barley which may be sown nearby. Infested areas should be ploughed down deeply so that the flies when they emerge from the flax seeds shall be unable to work their way out. Then any crop may be sown except spring wheat. Barley and rye are also sometimes liable to attack; consequently, other crops are preferable to these, such as oats, peas, corn or roots There will sometimes be cases where the farmer is uncertain what it is best to do, owing to the occurence of uninjured patches in an otherwise badly infested field. In these cases it will be best to wait and see how the wheat will turn out. If at last something else has to be substituted as a crop, probably the best returns will be obtained by sowing early ripening corn where a cultivator can be used, or early peas where the patches are surrounded by wheat. Both of these crops may be sown as late even as the middle of June and will give good results. Mr. N. H. Cowley, a very careful observer,

of Waterford, Ont., has noticed that different varieties of wheat are not injured to the same extent; for instance, in one field of Clawson wheat about eighty per cent. of the plants contained Hessian Fly puparia, while Democrat wheat near at hand was only injured to an extent of thirty per cent. Again, Clawson wheat was as a rule attacked in the upper and earlier sprout which was killed, but an uninjured sprout was growing from the seed. Democrat wheat, on the other hand, showed the original sprout uninjured or to a much less degree than the other variety, and the secondary shoot had not by the end of November so far been produced. Of the two fields the Democrat looked green and healthy, but the Clawson looked yellow and faded, and there was a great deal of rust on the leaves.

A yellow colour so often referred to by farmers as an indication of the presence of Hessian Fly is a sign by no means always to be relied on, for, as Professor Webster, of Ohio, has pointed out, infested plants are for a time of a brighter green and more stocky than those in a healthy condition. However, there are frequently in the autumn enough dead leaves and shoots to give the fields a brown and unhealthy appearance, and these together with leaves attacked by the fungous disease rust, which sometimes, as during the present autumn, is very abundant, may have been the cause of the appearance which is so often described as "yellow from Hessian Fly."

Cutworms in Grain.—There have been reports from restricted localities chiefly in the western counties, of injury to grain fields by the larvæ of the amputating brocade moth (*Hadena arctica*, Bdv.) and other cutworms.

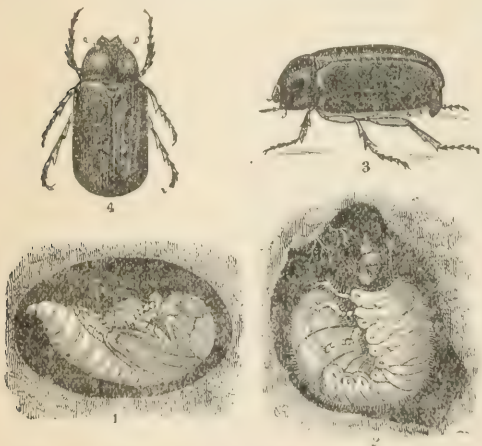


Fig. 15.—White grub: 1. pupa; 2. larva; 3 and 4. June beetle.

Wireworms are mentioned in several localities but no specimens have been sent in.

White Grubs. The larvæ of the June beetles (*Lachnosterna*), (Fig. 15, 3 and 4), have done a good deal of harm not only in pastures but to some field crops in different parts of the province. Notwithstanding the very different appearance of these two kinds of grubs, I find that they are very frequently confounded with each other by farmers. Wireworms (Fig. 19), the larvæ of the Click Beetles (Figs. 16, 17, 18), are slender cylindrical shaped, tough-skinned, bright yellow, grubs, about one inch long by one-eighth of an inch, or less, wide. The two ends of the body are somewhat similar in general appearance; Fig. 20 represents the pupa of a wireworm, upper and under side. White Grubs (Fig. 15, 2) on the other hand, are much larger, heavy-bodied, almost sack-shaped, white grubs with yellow heads having the end of the body enlarged, curved down and brown from their earthy contents showing through the thin skin. If the body were straightened, it would measure an inch and a half or more, by three-eighths of an inch wide at the widest part. The duration of the larval life of these two insects is probably about the same. The eggs of the June beetles are laid in spring, and the young grubs feed all the first summer and through the second one, attacking the roots of all kinds of plants, but being most numerous in fields where there are trees, or round the edges of fields near trees. By the end of the second summer they become full-grown and change to beetles, but do not emerge until the spring of the third year. Wireworms begin their lives much less regularly at any certain time of the year; the perfect beetles belong to a very large number of genera and species, which occur through the season, and the eggs

Fig. 16.

Fig. 17.

Fig. 18.

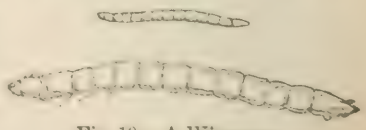


Fig. 19.—A Wireworm.

of some kinds may be laid at any time. The food of wireworms has a much larger range than is the case with the white grubs, many, and these are the most injurious species, feed upon the roots of grain and other crops, grass, shrubs and trees. Some feed on decaying wood and other vegetable matter, and some, at any rate occasionally, are even predaceous. On the whole, however, the class must be considered as decidedly injurious. In the beetle state Click-beetles (Fig. 21) are not considered very destructive but one species, *Corymbites tarsalis*, Melsh, has of late years been detected as a rather frequent enemy of the apple, feeding in the flowers and destroying the essential organs, and also eating the young foliage. As a general remedy for both of the above named classes of insects, late ploughing has been found beneficial, by breaking up the pupal cells at the time the insect is in a tender condition and exposing it to many dangers when it is either a pupa or an immature beetle, and unable to make another cell. The trapping of the mature Click-beetles by using pieces of potato poisoned with Paris green placed on the ground near where the beetles seem to be abundant is claimed by some experimenters to have been attended with considerable success. The June beetles are largely foliage eaters and are specially attracted to certain kinds of trees. Many may be destroyed by spraying these attractive trees with Paris green and lime, which may be applied as strongly as one pound of Paris green with two pounds of lime in 100 gallons of water.

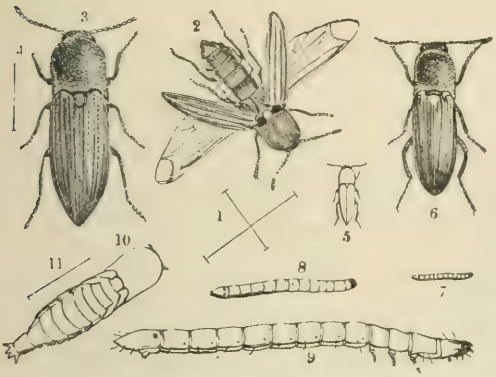


Fig. 21.—Click-beetles and Wireworms—2, 3, 6, 9, 11, magnified.

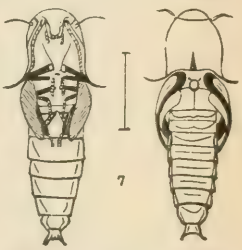


Fig. 20.—Pupa of Click-beetle.

The Pea Weevil (*Bruchus pisorum*, L., Fig 22).—Year after year, the loss in the pea crop from that old and well known enemy, the Pea Weevil, is simply appalling. The life history is well known and it must be claimed that the remedy is practical, that is, effective, cheap and easy, and yet it is not applied regularly by pea growers as it ought to be. As far as I can learn, the large seed merchants and the large growers do fumigate their pease with bisulphide of carbon and destroy the contained insects. The trouble seems to be with the small growers and farmers who save a few bushels for seed and do not take the trouble to treat these small quantities. As is well known, the Pea Weevil comes to maturity in autumn and if the season is favorable emerges at that time of the year and passes the winter under rubbish and in out-buildings. Many, however, remain in the pease and do not emerge until the following spring, when they are frequently sown with the seed. The perfect insects are very active little beetles which fly easily to the pea fields about the time the blossoms appear. They feed for some time on the flowers and leaves. As soon as the young pods are formed, the females lay their eggs upon them, from which the grubs hatch and eat their way into the pod and penetrate the forming seeds.

Fig 22.—Pea Weevil—greatly enlarged, and of natural size.

Remedies: The best remedies for this insect are the treatment of the seed with bisulphide of carbon, late sowing and the holding over of seed. Fumigating with bisulphide of carbon is the method now generally adopted by seed merchants and most of them have special houses for "bugging pease." Farmers can easily make use of this same method by taking an ordinary 45 gallon coal oil barrel which will hold five bushels of pease. According to the quantity of seed to be treated, one ounce of bisulphide is used to every 100 pounds of pease, that is three ounces if the barrel is filled. The chemical may be either placed in a flat open basin on the top, or it may be poured

directly on to the grain. The top of the barrel must be quickly replaced and covered up with cloths, etc., as tightly as possible. This treatment should be carried on in a shed out of doors, and the barrel must not be opened for 48 hours. Bisulphide of carbon is a colourless malodorous liquid which volatilizes readily at ordinary temperatures. The vapour is quite invisible, but being heavier than air it sinks readily and permeates the contents of the barrel. It is very inflammable and care must be taken when using it that no light of any kind is brought near. This treatment should be done in the autumn as soon as possible after the pease are threshed and before the weather has become cold. The sooner the treatment is done, the less injury the weevils will have done to the seeds, and, if the bisulphide is not used until cold weather has set in, its effect upon the insects is very much less than when they are in an active condition. Moreover, by delaying treatment there is the risk in mild autumns that the beetles may have attained full growth and left the seeds. The late sowing of peas is useful in preventing attack by weevil, but the method is not in favour with farmers because late sown peas in certain seasons are liable to be so much attacked by mildew as to reduce the crop sometimes more than would be done by the weevil. The holding over of pease until the second year, keeping them in close bags to prevent the escape of the beetles, is certainly a good remedy and is not practised by those who use small quantities of seed as much as it ought to be. The reduction of vitality of seed pease held over for one year is very little indeed. Unlike the Bean Weevil, the Pea Weevil cannot propagate in the dry seed so that every beetle which emerges dies inside the sacks. Before sowing, the injured seeds must be separated and only those which are perfect planted.

The Pea Moth (*Semasia nigricana*, Steph., Fig. 23).—In the eastern counties of Ontario and extending down through Quebec into the Maritime Provinces, much harm has been done by the caterpillars of the Pea Moth. They have been particularly abundant at Ottawa this year in late peas. As this insect resembles the Codling Moth very much in its methods of attack, some experiments were tried at my request by Mr. J. E Wetmore, of Clifton, N.B., by spraying the vines when the young pods were forming with a Paris green mixture which had been rendered adhesive by the addition of whale-oil soap. The results from these experiments, although not conclusive, are of a hopeful character and will form the basis of further experiments next year.

Fig. 23.—The Pea Moth—natural size and enlarged.

The Destructive Pea Aphis (*Nectarophora destructor*, Jnsn.).—This insect which was the cause of such extensive injury to the pea crop last year not only in the southern States but extending further north into Canada, has this year not been so bad as in 1899 but still has caused considerable loss. In the eastern counties the larger number of attacks have been noticed. The J. H. Allan Seed Company, of Picton, reports that "this season it has done considerable damage in New York State, Michigan and Wisconsin. Last season as well as this it caused injury in Prince Edward County as well as in Lennox and Addington. We are also told that it did much damage in Renfrew County." Last year in the State of Maryland the loss from this insect was put at $3,000,000, and during the past summer the loss in the same crop much exceeded that amount. Moreover, not only did this insect attack the pea crop but it was found to be much more distinctively an enemy of clover. This attack upon clover was not serious in Canada, and at Ottawa, where plots of peas were entirely destroyed by it, clover plots closely contiguous showed no sign of the presence of the aphis until very late in the season, when all peas had been killed by frost (November), and when a few were found. Many remedies were experimented with by Prof. Johnson, State Entomologist of Maryland, the describer of the species, and it was found that what has been called "the brush and cultivator method" was the most effective. For this it is necessary that the peas should be sowed in rows from 24 to 30 inches apart, and not broadcasted. He says, "The vines were brushed backward and forward with a good pine switch ahead of an Iron Age cultivator, which was drawn by one horse, and in this manner the insects which leave the vines freely when

these are shaken were covered up and a large proportion of them destroyed." The cultivation was not repeated until the third day, as it usually required 48 hours to destroy the insects when covered with earth. Another method which was tried with considerable success, consisted of a brush which dislodged the insects so that they fell into a pan containing coal oil and water, and dragged between the rows. In this way a bushel of plant lice were caught to each row of peas 125 rods long. Spraying was tested, but it was abandoned because no spray could be found which would destroy a large enough percentage of the insects to warrant the expense of the operation. An extensive experiment, however, covering 600 acres where the plants were brushed and cultivated every third day for a period of two weeks, forty men being employed, was very successful. In this manner the entire field was saved, netting the owner from 25,000 to 30,000 cases of peas of two dozen tins each. It is also stated that a field not far distant where nothing was done, was to ally ruined. As is usually the case with all kinds of plant lice when they occur in excessive numbers, the Destructive Pea Aphis has been vigorously attacked by many kinds of parasites, which at Ottawa, at any rate, have had a remarkable effect in reducing its numbers Although the plant lice were extremely abundant in some places, they were almost totally wiped out on one or two occasions by certain of these enemies. The most useful parasite at Ottawa was a small dipterous fly, probably of the genus *Diplosis*. The small orange maggots of about a sixteenth of an inch in length crawled about among the colonies of plant lice and destroyed them in large numbers, piercing their bodies with their mouth parts and sucking out their juices in the same manner as is done by the larvæ of Syrphus flies. When full-grown these larvæ spin a small close cocoon either in the angles of the leaves or stem, or falling to the ground make a cocoon of silk with particles of sand attached. There were continuous broods of this useful parasite throughout the season, and the minute gray midges could be seen about the infested plants at all times. The last brood spun their cocoons in the middle of October, and the larvæ will remain in them until next spring. Several species of lady-bird beetles, Syrphus flies and lace-winged flies were also abundant, as well as species belonging to the hymenopterous genera *Praon* and *Aphidius*. The first of these emerges from its host and spins a cocoon beneath the dead body. The latter passes through all its stages inside the body of the plant-louse and when mature eats its way out through a circular hole.

Fodder Crops.

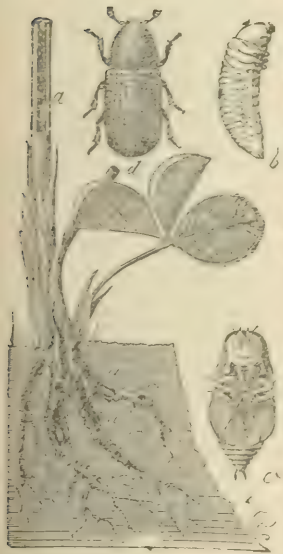


Fig. 24.—Clover Root-borer.

The Clover Root-borer (*Hylastinus obscurus*, Marsh=, Hylesinus trifolii, Muell., Fig. 24)—The Clover Root-borer generally occurs in a few localities in Canada every year, but is seldom the cause of much harm and this will be more and more the case not only with this species, but with the Large Clover Weevil (*Phytonomus punctatus*), as farmers get more into the way of sowing clover to a larger extent as a green fertilizer and plough it down after the first crop. During the past summer the Clover Root-borer was observed doing some harm in old fields of clover but also in some new ones right across the province. The worst occurrences were near London, at Picton and in a small patch at Ottawa. Clover which is infested flowers irregularly and the plants have an unhealthy appearance. The insect may be found in autumn in all stages in the roots of clover plants; the beetle comes to full growth late in autumn and remains in its burrows until the following spring. The remedy for this insect is a short rotation. The value of clover as a fertilizer is now so well known that farmers do not hesitate to plough down their meadows as soon as they find traces of this insect. This should be done as soon as there is a pretty good growth on the ground after the first crop of hay has been removed.

The Large Clover Weevil (*Phytonomus punctatus*, Fab.) was found to be abundant in the larval condition in a field, near Picton, Ont., which

was also infested by the Clover Root-borer. These larvæ, however, were almost all attacked by the fungus *Entomophthora phytonomi*, Arthur. Almost every blade of grass rising above the clover had at its tip a dead or moribund larva, and of a large number which were apparently healthy, collected for rearing, there was hardly a specimen which produced the beetle. The diseased grubs were of all sizes from very small to full-grown. This was on the 24th of May. A few of the full-grown larvæ taken at that time spun their lace-like cocoons in the beginning of June and two beetles emerged about the end of the month. The beetles measure over four-tenths of an inch in length, are oval in shape and of a brown colour with four pale punctured lines on the sides. The beak is rather short and blunt, the thorax smooth and swollen with three pale lines. The wing cases each bear ten deeply impressed lines of punctures, from which the species takes its name.

Roots and Vegetables.

A great number of insects have been complained of during the past season as having attacked more or less root crops and vegetables. Some of the more important of these are the following:

Cutworms.—The Spotted Cutworm, as the larva of *Noctua C nigrum*, L, Fig. 25, has been inappropriately called, was extremely abundant in many localities along the north shore of Lake Ontario, injuring all kinds of garden and root crops. This is never a rare insect, but this year it was enormously abundant. The brood of which larvæ are found during July, was the one this year which did most harm. This species seemed to take the place in Ontario and resembled very much in its habits and time of appearance, the Variegated Cut-worm, *Peridroma saucia*, of which there has been a disastrous outbreak this summer all through the Province of British Columbia. The larva of *Noctua C-nigrum* is grey or pale brownish of varying shades. When full-grown it is nearly an inch and three-quarters long, rather slender, being less than a quarter of an inch at its widest part. The markings are difficult to describe, and vary very much in intensity. There is always a pinkish sub stigmatal stripe, and the whole of the dorsal area is more or less crossed and darkened by indistinct blackish blotches or mottlings, which on each segment on the dorsum take somewhat the shape of the letter "M" with the top pointing towards the anal end. In some specimens there is a supra-lateral row of spots on each side gradually increasing towards the anal end both in size and intensity of velvety black. On the last segments these are elongated angular blotches with the apex pointing forward. There is also a narrow medio-dorsal pale line and a pale lateral line on each side. However, no two specimens agree exactly in ornamentation, but all have the appearance of being covered with a course network of black more or less obsolete over a pale brown ground colour. The moths appeared in large numbers from July till the end of the season and it is most probable that the eggs are laid in late summer and autumn and that the larvæ hibernate half-grown.

Fig. 25.—Moth of Spotted Cutworm.

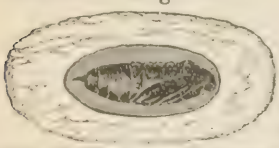


Fig. 26.—Variegated Cutworm: pupa.

The Variegated Cut-worm (*Peridroma saucia* Hbn.) was also found in considerable numbers, the large caterpillars nearly two inches long by over a quarter of an inch wide, attacking all garden plants and also doing harm in orchards upon apple trees. Some pupæ of this species (Fig. 26) with the moths ready to emerge were found at Ottawa in the beginning of November, but the weather changed immediately afterwards, and it is hardly likely that the whole of this brood produced moths before winter set in. The life history of this species in Canada as to hibernation is not definitely known from actual observation, but from the above incident it would appear as if moths which emerge in July and August, must lay their eggs (Fig. 27) and the larvæ hibernate partially grown. Moths which emerge in October and November probably pass the winter in that condition, and it would also appear as if some must remain in pupa until the following spring.

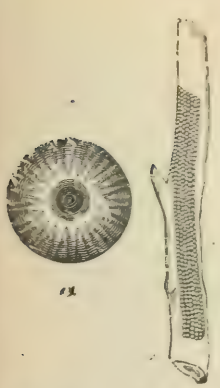


Fig. 27. — Variegated Cutworm: *a*, single egg, highly magnified; egg cluster on twig.

The remedies for cutworms which have given the best results are the banding of freshly set out annual plants, either with rings of paper or tin, so that this protection extends down about an inch beneath the surface of the soil and an inch and a half or two inches above it. Faded leaves which hang down and touch the ground must be cut off. This protection is particularly applicable for cabbages, tomatoes and tobacco. For clearing infested land either just before planting or when a crop is found to be attacked, the now well known mixture of bran and Paris green gives excellent results. This mixture may be applied either wet or dry. In the latter method the bran should be slightly dampened with water containing 2 or 3 ounces of sugar to the gallon of water. After mixing thoroughly so that the whole mass may be slightly moist, but at the same time feel dry to the touch, dust over it a sufficient quantity of Paris green, green arsenoid, or some other similar poison, to give the mixture a slightly green colour. In the former recommendations it was advised to add the Paris green to the bran in a dry condition; but this is not satisfactory, because on account of the weight of this poison it sinks at once to the bottom when stirred. The bran or meal mixture should be sufficiently dry to run through the fingers easily. It should then be placed in small heaps a few feet apart where the cutworms are thickest and will be greedily eaten by these insects. This is merely a modification of Prof. Riley's trap remedy which has been used successfully for many years. This consists of tying up in small bundles any green succulent vegetation such as any luxurient weed which may be growing by roadsides, and after dipping them in a strong mixture of Paris green and water, distribute them over the land or along the rows of a crop. The greatest drawback to this method of fighting cutworms is the fading of the plant used. This may be prevented to a certain extent by placing a shingle on the top of each, which has the double advantage of attracting the cutworms as a hiding place, and of preventing evaporation from the bundles. It is seldom that plants attacked by cutworms can be treated successfully by spraying, except in the case of climbing cutworms in orchards.

Cabbage Worms —The cabbage crop during the past season has suffered from several enemies. The root maggots caused great havoc in many places among cauliflowers and early cabbages. The Diamond-back Moth (*Plutella cruciferarum*, Zell) was abundant and destructive in dry districts to cabbages, turnips and rape, but the worst enemy of the cabbage crop this year was the White Cabbage Butterfly (*Pieris rapæ*, L.), the green caterpillars of which were so numerous from Peterborough westward almost to Hamilton and also at Ottawa and other places, as to reduce seriously the crop of turnips which, owing to the leaves being destroyed, could not "bulb" Cabbages in fields and gardens were also seriously injured. There are always every year certain insects which are liable to increase and do harm, but the Cabbage Butterfly is one which may be treated with comparative ease. The caterpillars are particularly susceptible to the effects of pyrethrum insect powder, and, if a mixture be made of one pound of this powder with four pounds of cheap flour and the whole be kept for twenty-four hours in a tightly closed jar or canister, and then dusted over the plants, it will kill all of the caterpillars upon which it falls, without injury to the plants and without danger to those who consume them. The proprietary mixture known as Slug Shot has also proved very deadly against "cabbage worms," as these caterpillars are generally called, but this must only be used early in the season while the plants are small, as it contains poison. This insect was probably more abundant during the past season than it has ever been noticed before, but toward the end of the summer it was destroyed in enormous numbers by an epidemic bacterial disease. Caterpillars which were attacked, first assumed a pallid or bluish white appearance and then gradually turned brown in blotches which enlarged until the whole body was a putrid mass. This disease was at its height in the beginning of September and continued to the end of the season. The spread of the White Cabbage Butterfly has been very rapid. It is said to have been imported into America first at Quebec about 1858, from which point it has spread in every direction. Although it had reached the Pacific coast in the United States some years ago, it is only during the past summer that it has appeared as an enemy of the cabbage grower on the coast in British Columbia.

The first record for that province was by Mr. J. W. Cockle who found it at Kaslo in the Kootenay district last year.

The Diamond-back Moth (*Plutella cruciferarum*, Zell.) seldom does very much harm in Ontario but in the West it is terribly destructive to all crops belonging to the Cabbage family, and, owing to the fact that the caterpillars feed almost entirely beneath the leaves, it is extremely difficult to apply an effective remedy. The best results have been obtained with dry powdery mixtures containing poison, blown between the leaves by means of agricultural bellows and insect guns. For this purpose, a strong mixture of one pound of Paris green in 25 pounds of air-slaked lime, or perfectly dry flour, gave good results If liquid applications are used, a sufficient quantity of soap must be added to make them adhere to the foliage of such plants as turnips and cabbages, and a nozzle on an angled support must be used so as to throw the spray well up under the leaves. A knapsack sprayer with a cyclone nozzle answers well for this purpose.

The Root Maggots (*Anthomyidæ*).—These troublesome insects have as usual done a great deal of harm and many experiments have been tried to secure a practical remedy. Unfortunately no very good results have been obtained. Onions, cabbages of all kinds, beans, corn and radishes have suffered. Mixtures containing carbolic acid in some form seem to be the most hopeful. Whale-oil soap gave tolerably good results. The most satisfactory experiments were with early cauliflowers which were protected to a large extent by means of the Gough Tar-paper Discs. These consist of a disk of ordinary tarred building felt with a split from the margin to the centre so as to allow of their being placed around the stems of newly planted cauliflowers. The odour of the tarred paper preventing the flies from laying their eggs, and the tarred paper disc also had the effect of holding moisture around the roots and inducing a copious growth of young rootlets, which were of great service in helping lightly attacked plants to outgrow the injury.

Asparagus Beetles.—The two species of Asparagus Beetles which were mentioned in our last report are still present in the Niagara district and together with the Asparagus Rust have done a certain amount of harm. Fig. 28 represents *Crioceris asparagi*, L, eggs on plant, larva and beetle. They have not,however, spread through the district to the same extent as it was thought they would last season, judging from their sudden appearance in the country in such large numbers. Asparagus growers seem to have grasped the idea of fighting them as larvæ, and a great many beds were dusted regularly with fresh lime when the larvæ were upon them. This seems to have been the remedy which was most used.

Fig 28.

Turnip Aphis (*Aphis brassicæ*, L.).—There has been a decided absence of the Turnip Aphis in most parts of the Province during the season of 1900, except up in the north-western counties. In some places in Huron County the loss has amounted to about half or more of the crop. The eggs for this species are laid in large quantities on the old leaves of the turnips,and where these are cut from the plants and left in the fields it would be well to plough them down deeply, so that the young plant-lice when they hatch in spring would be unable to get out. It would of course be well also to avoid planting a crop of the Cabbage or Turnip family on the same land the following year.

Fig. 29.—Turnip Aphis.

Fruits.

The large amount of attention which has been devoted to fruit trees and orchard pests consequent upon the accidental introduction into Canada of the San José Scale, which is discussed fully in another part of this Report, has had a decidedly good effect in stirring up fruit growers to attend more carefully to their orchards. Spraying has been more regularly and generally done for leaf-eating insects and Codling Moth Late fall

and early spring applications have been made for scale insects and all the operations of the orchard seem to be better attended to than was formerly the case. Fruit growers are learning the habits of many of their regular pests, and there is a much greater demand for information about injurious insects than was the case only a year or two ago.

The CODLING MOTH and PLUM CURCULIO do not seem to have been so destructive, judging from reports received, as usual. The TENT CATERPILLARS which have been so abundant all through the Dominion were decided less destructive last spring. The Eye-

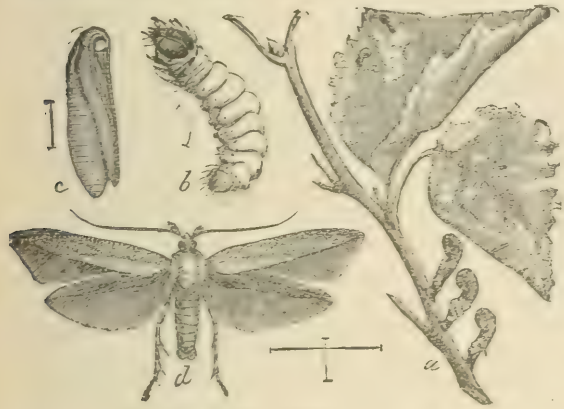


Fig. 30.—Apple Pistol Case-borer.

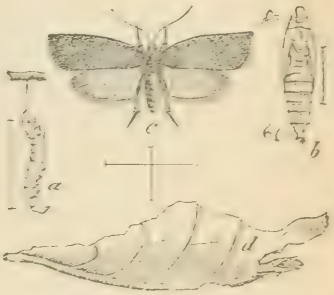


Fig. 31.—Apple Leaf-Roller (*Teras minuta*, var. *cinderella*.

spotted Bud moth and Oblique-banded Leaf-roller did their share of mischief, and early spring insects were rather more than usually troublesome along the shores of Lake Ontario. The Cigar Case-bearer, the Apple Pistol Case-bearer (Fig. 30) and leaf-rollers (Fig. 31) were about equally abundant and where neglected did harm. The species of leaf-roller which seemed to do the most harm was *Lophoderus quadrifasciana*, Fern. From Hamilton larvæ of the PALMER WORM (*Ypsolophus pometellus*, Harr.) were sent at the end of June, and a little later the same thing was sent in from Oakville. This is rather an unusual pest in Canada and had attracted attention from the extreme activity of the caterpillars. The ROSE CHAFER was reported as troublesome on apple trees at Niagara and Grimsby, and the CLOVER MITE did considerable harm to fruit trees all through the western counties where it was generally reported as "Red Spider." CANKERWORMS were destructive in restricted localities during May and early June. The species of which specimens were sent in, proved to be the Fall Cankerworm. The BASSWOOD LOOPER (*Hybernia tiliaria*, Harr.) Fig. 32 was particularly abundant in the Ottawa district, attacking not only apple trees but various forest trees, especially the maple, elm and basswood. In western Ontario, especially in the Niagara district, an interesting little moth, the larva

Fig. 32.—The Basswood Looper.

of which mines in apple leaves and sometimes does rather noticeable injury when abundant, is *Nepticula pomivorella*, Pack. The larva when full-grown leaves its mines in the foliage and spins small scale-like brown cocoons on the twigs where it passes the winter. This insect was formerly placed in the genus Micropteryx but it has been discovered by Mr. Busck of Washington that it is a true *Nepticula*.

Pear trees have suffered rather more than usual from three of their enemies. The Cherry Slug in some places has stripped the green cellular parts from the foliage to such an extent as to render the leaves quite useless to the trees, and as a consequence the fruit was ruined. This insect can be very easily kept in check either by spraying with arsenical poisons or by dusting constantly with freshly slaked lime. The Pear Psylla was particularly troublesome at Freeman, near Hamilton, and through the western counties. Mr. Geo. E. Fisher considers this an insect which requires much more attention than up to the present it has received. The mature insect hibernates beneath the flakes of bark on the trunks and larger limbs and can be destroyed during the winter by a 30 per cent. mechanical mixture of crude petroleum and water, or by the ordinary kerosene emulsion. The Pear-leaf Blister-mite is not quite as bad as it was a year or two ago but still is much more abundant than is good for the pear trees or the pocket-book of the fruit grower. On the Pacific Coast this insect is kept well in check with the lime, sulphur and salt mixture. This mixture has not been used very much in Ontario but the well-known kerosene emulsion sprayed over the infested trees just as the buds are bursting has been found very effective. Doubtless the mixtures of crude petroleum and water which are now coming so much into use will be found very effective against the Pear-leaf Blister-mite as soon as the proper portion to use with safety has been discovered.

INSECTS OF THE SEASON OF 1900.

By Prof. W. Lochhead, Ontario Agricultural College, Guelph.

In looking backward over the entire season of 1900 it would appear that insect pests were more numerous and produced greater losses than usual. It is very difficult to determine the exact causes which were operating to produce the results, and valuable indeed would be trustworthy observations along this line. Perhaps the dryness of the season which prevented serious outbreaks of fungous diseases operated on behalf of the insects; perhaps the mildness of last winter enabled many more forms than usual to pass through the dormant season; perhaps parasites were not so numerous as usual; but whether there was one cause or a combination of causes the number of injurious insects was on the increase during the past season. Mention will be made of a few of the most injurious forms brought to the writer's attention chiefly by farmers and others in correspondence with the Biological Department of the Ontario Agricultural College.

Orchard Insects.

The Fruit Bark-Beetle (Scolytus rugulosus). Complaints have reached us from Kingsville regarding the injuries done by this beetle. It attacks especially plum trees, and many of Mr. J. D. Wigle's trees died from the injuries. It is probable that trees in other sections are likewise affected, and watchfulness is required to prevent surrounding trees from becoming infested. From breeding experiments carried on at the College the writer finds that the adults appear about the middle of May. They bore holes through the bark into the wood, and proceed to make burrows in which to deposit eggs. The young grubs also make burrows, and within a month the beetles appear. Several broods may appear in a season so that the trunk soon becomes honey-combed with tunnels and dies. See Fig. 3 (on page 35) which represents the work of an allied species (S. destructor).

Badly infested trees should be cut down and burned, while those but slightly infested should be sprayed with whitewash, or with a mixture of whale-oil soap and carbolic acid.

The San Jose Scale (Aspidiotus perniciosus). This pernicious scale is still with us in abundance, and in spite of the treatment of last spring it is just as numerous as it was last fall. Many new infestations have also been discovered, so that the whole problem of treatment will have to be taken up anew. Mr. Fisher, Chief Inspector, considers crude petroleum more effective than whale-oil soap in killing the scale, but Prof. Webster, of Ohio, maintains that crude petroleum is too dangerous a remedy to put in the hands of the ordinary fruit-grower, and accordingly prefers whale-oil soap. The scale is here to stay and the sooner the orchardist recognizes this fact, and the need of effective treatment to keep it in check the better will it be for the fruit industry of the Province. A great industry is at stake. Can we afford to lose this great industry?

Garden Insects.

The Bean Fly. (Anthomyia radicum)—In June many complaints reached the office regarding the attacks of grubs on beans in Lambton County. One correspondent wrote that hundreds of acres of beans were being destroyed. Many of the beans did not germinate at all, due to the fact that the maggot ate the interior of the seed, and many of the stems never developed leaves through the destruction of the central portion of the stem. Figure 33 shows very well the nature of the work of the maggot both in the seed and the stem. The maggots are about one-fifth inch long and yellowish-white in color. They taper to a point in front and broaden out behind. After feeding for a while the maggots descend into the ground, and change into barrel-shaped pupae. A week or ten days later the flies emerge from the pupa cases and proceed to mate and deposit eggs. After June no further complaint was made, although many growers had replanted their fields. No remedies could be suggested beyond replanting as early as possible, and not as deep as usual. It is just probable that the deep planting of the seed beans was the direct cause of the injury by the maggots, for the usual food of these creatures is decaying matter. The beans began to show signs of decay, and the maggots took kindly to their new food-supply.

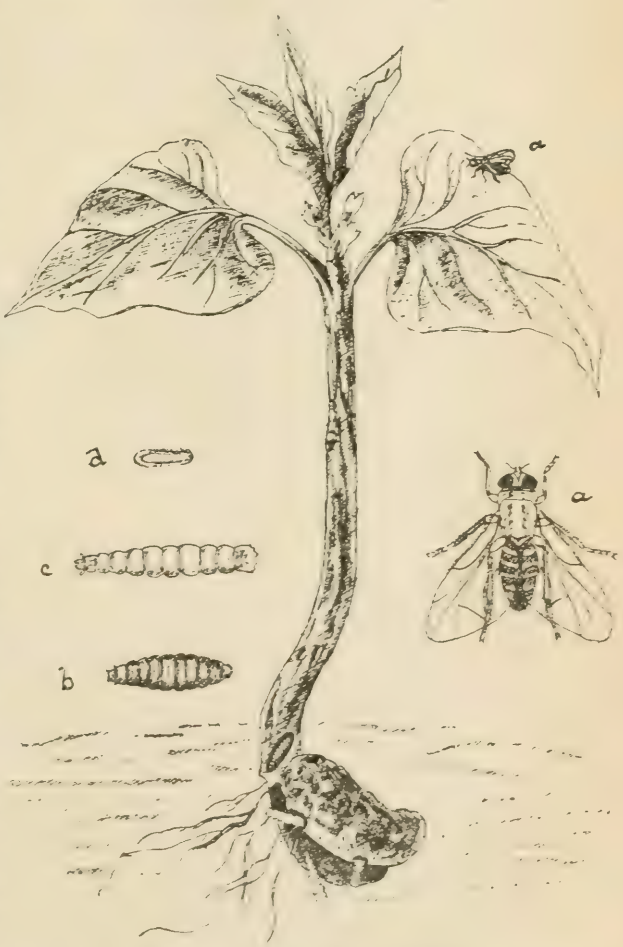


Fig. 33.—The Bean Fly— (a) adult flies; (b) pupa case in ground; (c) maggot; (d) an egg. (After Lugger).

Cutworms. (Noctua c-nigrum, Peridroma saucia, and others.) These night intruders worked considerable damage in gardens and fields during June and July, but the spreading broadcast of handfuls of bran mash, poisoned with Paris green and sweetened with a little sugar, generally put a stop to their depredations in gardens. The most common forms sent in for identification were The Variegated Cutworm (Peridromia saucia), and The Spotted Cutworm, (Noctua c-nigrum).

Asparagus Beetles. (Crioceris asparagi, Fig. 34, and C. 12-punctatus).—Mr. W. N. Hutt, B. S. A., of Southend, reports to me that C. asparagi appeared very early, just as the first young shoots of asparagus were pushing through, and were three or four times as numerous as last year. The C. 12-punctata appeared two weeks later than the common species, and were even more numerous. The Department sent out a circular in early spring to the newspapers of the Niagara District, which explained clearly the methods to be adopted in combatting the asparagus beetles, but it would seem as if many gardeners failed to pay much heed to the instructions.

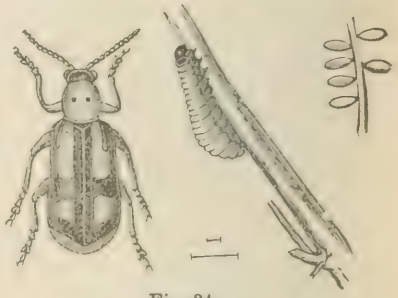


Fig 34.

The westward progress of these beetles has not been very noticeable this year, for although abundant around St. Catharines and Niagara, they have not been observed at Grimsby or Winona. Mr. Johnston reports them, however, from Bartonville, which lies between Winona and Hamilton.

The Bumble Flower-Beetle (Euphoria inda). Fig. 35. This beetle was very common in September and did considerable damage by eating holes in pears and tomatoes. Although the beetles occur in sufficient numbers occasionally to do considerable damage, yet this visitation is but periodical. Recent observations at Washington show that this insect is injurious only in the adult state, and that the grub feeds on manure and humus.

Fig 35.

The beetles hibernate, and eggs are laid in the early part of May, and the grubs mature in about two months. The pupa stage lasts about 16 days. The beetle is readily recognized by its triangular thorax, the yellowish-brown wing-covers mottled with black markings, and the grayish pubescence on the under surface of the body and on the legs and thorax.

The only practicable remedy is to collect these beetles.

Farm Insects.

The Hessian Fly (Cecidomyia destructor). The most serious insect pest of farm crops during the past season was the Hessian Fly, which destroyed the wheat crop in many sections. So far as we are acquainted with the conditions surrounding this pest, it is safe to say that the most available remedy is Late Sowing. Wheat sown as late as the last week in September has been found unaffected, while that sown before was affected. It is evident that farmers as a rule do not make any serious attempt to carry out the recommendations of practical entomologists in the matter of late sowing, trap crops, or uniformity in time of sowing.

The writer urges that this question, a most important one for the Province, be taken up by the Government, and extensive experiments be carried on in various sections to determine the most favorable conditions for sowing to avoid attack. These conditions have not yet been determined for Ontario.

Among the other serious insects infesting farm crops this past season were *Cutworms* which were abundant in root crops, and even in wheat fields (according to some correspondents). The more common species were the *Variegated Cutworm* (Peridroma saucia), the Spotted Cutworm (Noctua c-nigrum), and the Glassy Cutworm (Hadena devastatrix). The use of poisoned bran mashes has been found very beneficial in those cases where the remedy is practicable. A knowledge of the life history is often necessary to know the best time to sow grain to escape the cutworm.

The *Pea-weevil* and the *Pea-aphis* have made the growing of peas an uncertain crop in many localities. There is a practicable remedy for the weevil in the use of carbon bisulphide, or in the holding over of the seed peas for another season, when the weevils will have disappeared and the good seeds can be picked out. With regard to the Pea-aphis, should it become destructive it will be necessary for the pea grower to change his method of cultivation, and adopt drill planting, instead of planting broadcast as is done at the present time.

Fig. 36. An Ear of Corn affected by Corn-Worm; Caterpillars are very variable in their markings. (Original).

The Corn Worm (Heliothis armiger). Fig. 36. This worm has been more numerous this season than usual, and appears to find Ontario conditions quite congenial. The green corn offered for sale in the Guelph market was frequently injured by the worm, and the Experimental Department of the College Farm found many ears badly injured at time of harvesting. The Trent Valley Canning Co. of Trenton reported on October 1st, that they had received a few loads of sweet corn containing many badly injured ears; and that in one locality from which they received corn the worm was very prevalent.

Observations point to the view that the Corn-worm is single brooded with us, but it may be double-brooded in some of the southern localities. Late fall-plowing will do much to break up the cells in which the pupae winter, thus causing the death of the pupae.

Grasshoppers were abundant in late summer, not only in meadows and cultivated fields, but also in gardens where tomatoes, cabbage, celery, and other vegetables were often destroyed. Very likely the dryness of the season and the absence of frost were important factors which contributed to their abundance.

The Cabbage Butterfly (Pieris rapae). This insect was more abundant than usual in cabbage and turnip fields, especially in the region lying to the east of Toronto. "Thousands of these winged insects could be seen flying over turnip fields." Although parasites are usually very abundant, it will not do to leave the work of extermination to them alone. A good practicable method of killing the cabbage-worms on small areas especially is to dust a mixture of one pound of insect powder and five pounds of flour through a cheese-cloth bag upon the infested plants.

NATURE STUDY LESSONS ON THE SQUASH BUG (ANASA TRISTIS).

By Prof. W. Lochhead, Ontario Agricultural College, Guelph.

Introduction. That a great awakening in the study of nature is in progress must be evident to every person who is watching the signs of the times. Both parents and teachers are demanding the introduction of nature-study into the daily course of the school, and scholars are becoming earnest nature seekers and observers.

The last Annual Report contained Nature-study Lessons on the Cabbage Butterfly, written in response to a desire for information about this common insect by several teachers who had been induced to introduce object lessons of such a nature into their schools. It appears that the lessons were helpful to many teachers, for frequent requests were made for the article during the past year. Believing that an information-article on some other common insect would be acceptable, the writer ventures again to outline a few lessons on the common Squash Bug of our cucumber and melon patches.

Fig. 37. The development of the Squash Bug. (*a*) The bug soon after it escapes from the egg; (*b*) the bug after the first moult; (*c*) the bug after the second moult; (*d*) the bug after the third moult; (*e*) the bug after the fourth moult; and (*f*) the adult bug after the fifth moult. (Original.)

Occurrence. Who has not seen the dull, smoky-brown insect or bug which hides under the wilted leaves of squash and cucumber in late summer? Or who has not thrown the bug down in disgust when the penetrating foul odour reached his nostrils? In the dead of winter one frequently comes across these bugs in crevices and corners of outbuildings and sheds, where they live in a torpid condition far into the warm weather of the next season. If outbuildings are not to be found the Squash Bugs hide under rubbish, bark and chips, which are usually present in carelessly kept gardens.

General Characters. When one can examine these bugs in spite of the offensiveness of the odour, many characteristic features will be revealed. The three pairs of legs, the two pairs of dark wings, a pair of feelers or antennæ, and the three divisions into head, thorax and abdomen (fig. 37, f) can be readily distinguished, and the thoughtful student will see at once that so far as the major characters are concerned the Squash Bug is similar to the Cabbage Butterfly. It is only when the minor characters, such as the texture of the wings, the shape of the mouth parts, and the size of the feelers and legs are considered that differences sufficient for classification purposes are seen.

Colour.—As to colour the adult winged squash bug is rusty-black, or smoky-brown above, and ochre-yellow below. If a magnifying glass be used it can be readily seen that the ground colour of the whole insect is ochre-yellow, and that the rusty-black colour above is produced by innumerable black dots which cover the legs as well as the wings and upper surface of the body.

It is interesting to notice the change in colour which the young bugs undergo as they pass through successive moults. When the bugs are young the under side of the abdomen is first greenish, then ashy-grey, and finally ochre-yellow. (Are the head and legs always of the same colour as the body?)

Head.—The study of the head of an insect is always instructive. The most prominent part of the head of a squash bug is the feelers or antennae, which are long, and divided into segments, the first and last being the stoutest. (Fig. 38.)

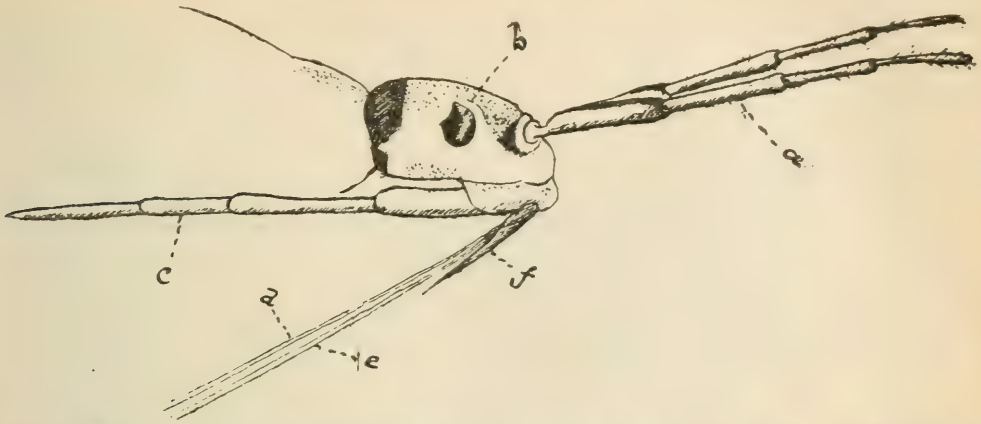


FIG. 38.—The head of the squash bug showing the antennae (a), the eyes (b), the 4-jointed beak (c), the four lances (d) and (e), and the labrum (f), (Original.)

The two large compound eyes situated behind the foot of the antennae are very similar to those of the cabbage butterfly, described and illustrated in last year's Report. In addition to the two compound eyes two simple eyes or ocelli may be seen with the aid of a magnifying glass between the large eyes. They look like minute glass beads.

If the under side of the head be examined a slender beak-like organ can be seen extending from the head backwards beyond the second pair of legs, (Figs 38 and 39), and a magnifying glass will show that this beak-like organ is a 4-jointed sheath, slit along one side. With the aid of a needle further information can be obtained by exposing the contents of the sheath. These are four fine lance-like structures which are apparently attached to a broader appendage near the head. (Fig. 38.)

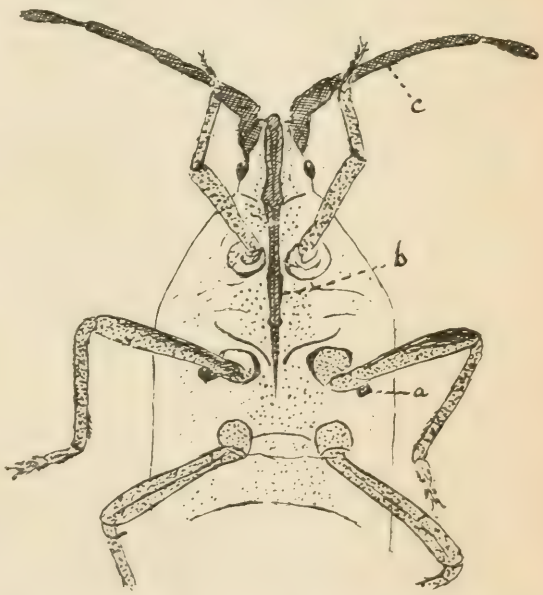


FIG 39.—The under surface of the squash bug showing the position of the two glands, (a) which secrete the foul odour, the beak (b), the antennae (c). (Original.)

Fig. 40.—The mouth parts of the common locust dissected out, the upper lip or labrum, (a) the mandibles, (b) the maxillæ, (c) and the under lip or labium, (d) (Original.)

The mouth-parts of the common locust are shown in figure 40, and it is evident that the different parts are adapted for biting and holding the object while biting. With the squash bug, however, the parts are not adapted for biting, but for sucking. The lower lip or labium forms the 4-jointed, grooved sheath, and the mandibles and maxillae form the four lance-like piercers, while the labrum is a scale-like flap to which, apparently, the piercers are attached. It will be observed that there are no palpi on either the maxillae or labium, but the parts have been modified for piercing and sucking.

The piercers penetrate the tissues of the leaf or stem, and by means of muscles at the base of the beak the fluids are drawn up. While the insect is puncturing the tissues with the piercers it drops in a little poison which causes the cells close by to wilt and die. Some observers consider the amount of damage done by the poison to be greater than that produced by the loss of sap.

Odour—The cause of the very disagreeable odour of squash bugs is a fluid which is secreted by two glands through two openings on the under surface of the body, situated close to the second pair of legs on the last segment of the thorax. (Fig. 39, a.)

Wings—The wings of the squash bug are characteristic of the large order of insects to which it belongs,—the Hemiptera, that is, the basal half of each of the outer pair of wings is thickened, while the outer half remains thin, membranous, and veiny. (Fig 41) The under pair of wings are thin and membranous, and are folded under the larger outer pair.

Eggs.—During July and even later the eggs are laid on the under side of the leaves in groups varying from 4 or 5 to 30 or 50. They are dull-red in colour, smooth and shining, about one twenty-fifth of an inch in length, and slightly flattened on two sides.

Nymphs.—The young bugs escape from the eggs in about ten days, and proceed directly to abstract nourishing fluids from the stems. The nymphs may be found in all stages of development under wilted leaves during August and September. (Fig. 37). It will be observed that the nymphs are broader in proportion to their length than the adults are, and their head and first segment of the thorax are small. As the nymphs develop by moulting the wings become longer.

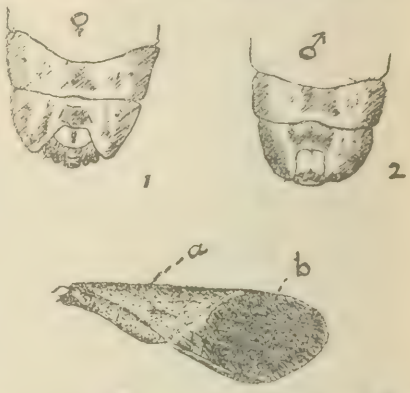


Fig. 41.—The outer wing of the Squash Bug showing the thickened inner half (a) and the membranous outer half (b). (Original)
The last segments of the abdomen showing the differences between the female (1) and male (2).

Remedies.—From the fact that the squash bug does not eat its food, it may be inferred that Paris Green placed on the stems or leaves is of no use in killing the pest. Many substances have been tried, but most have been found unsatisfactory. Kerosene emulsion diluted with 9 parts of water and sprayed upon the vines has given fairly good results, but perhaps the best plan is to clean up the squash patches thoroughly in the fall; to place pieces of boards and chips during the summer among the vines to decoy the bugs, when they may be readily killed; and to pick the old bugs and eggs in early summer and destroy them.

Topics For Observation.

1. The month, and day of the month when the young squash bugs are first observed.
2. The location of the eggs on the leaf,—their number, colour and shape.
3. The hatching of the eggs,—the duration of the egg state, the way the young bugs escape from the eggs.
4. The moulting of the nymphs,—the number of moults, the changes with each successive moult, and the duration of each stage.
5. The offensive odour,—the position of the secreting glands, the use of the fluid to the insect.
6. The best methods of controlling the insect in melon patches.
7. Males and females,—distinction and relative numbers. (Fig. 41, 1, 2).
8. The development of the wing.
9. Parasites.
10. Other insect enemies of the melon patch.
11. Mode of feeding,—the way the fluids are drawn up.

THE BREEDING OF LEPIDOPTERA, WITH NOTES ON THE INFLATION OF LARVÆ.

By Arthur Gibson, Central Experimental Farm, Ottawa.

The value attached to the breeding of insects cannot be over-estimated. The facts concerning the life-histories of species, resulting from careful work in rearing specimens, are of the greatest importance, and any person having a taste for this branch of study has many opportunities of doing excellent work. There is so much yet to be done in studying out the life-histories of insects, and so few people who care to take the time or trouble to do careful work, that those who are disposed have a field in which employment of a useful nature can be found. In the Order Lepidoptera alone there are hundreds of species which have never been properly worked out, and information of an authentic nature in regard to such is much desired. Facts concerning certain stages or habits of even some of our commonest butterflies and moths are badly wanted.

In breeding Lepidoptera from the egg to the imago, there is much of interest to observe. Some of the stages are intensely interesting, as everyone who has attempted breeding with any degree of success knows. The true object of breeding insects is not to get perfect specimens of the imago, but to study their earlier stages, taking careful notes of observations made, and giving the result of information thus obtained to others, through the medium of entomological publications. It cannot be said that such work is hard, but at the same time great care and accuracy are required, without mentioning the need of a good stock of patience.

To meet with the best results, two very important points must be borne in mind, and these are to see that the jars are kept thoroughly cleaned, and that sufficient, but not too much, of fresh food-plant is always present. The larvæ of butterflies, especially, require extra care and attention to see that the breeding-jars are always clean, and that the food-plant is kept fresh. Carelessness in this respect oftentimes causes failure. Breeding jars should be washed out at least every day, if the best results are desired, even twice a day is not too often for delicate larvæ. It is also often best to change the food plant twice a day.

In studying the earlier stages in the life-history of a butterfly or moth, as soon as the eggs hatch, it is well to put one of the larvæ in a small jar, keeping it separate from the others, so as to watch it carefully through its different moults. Two could be kept in the same jar, but instead of this it is better to have two small jars, one for each caterpillar. These should be kept beside the remainder of the brood, if any, so that they may also be watched, as many vary in the same stage. It is important that careful descriptions of the egg, the larva (in all its stages), the chrysalis, or pupa, and cocoon, if there is one, should be made, noting in fact everything of importance bearing upon the life-history of the species.

For the most part ordinary jelly jars with tin lids will answer for breeding lepidoptera; those with the rounded bottoms are preferable, as they do away with the chance of moisture gathering in the corners. Two or three different sized jars are more convenient than having them all the same. Of course if a large number of the same larvae are being reared bigger jars or breeding cages, will be found necessary. Some writers recommend tin boxes of various sizes. These also are excellent receptacles, and it is claimed that it is not necessary, when breeding sphingids, to put earth in the tin as the larvæ will readily pupate on the bottom of the box.

Careful watch must be made for the moults of the larvæ. Before moulting the caterpillar, as a rule, stops feeding for a day or so, during which time the front segments become swollen, so much so that they appear larger than the head, which with the cast skin, soon afterwards, usually during the following or the next day, is thrown off. As soon as the larva has moulted, a careful description should be taken, noting its length, shape, colour and arrangement of markings, size and shape of head, etc., etc. The cast skin and head should be preserved in a small bottle, or box, with careful data. The empty cocoon, pupa, or chrysalis, should also be preserved, as well as the egg shells.

A method by which the eggs of many moths may be secured is to capture a female, enclosing her alive in a small box for a day or so, and if she has not already laid eggs, it

is probable that she will do so in confinement. All females, however, will not lay eggs in confinement; from some it is exceedingly difficult to obtain ova. Eggs from butterflies especially are hard to procure, and extra inducements have sometimes to be offered. A good plan is to feed the female with a sweetened fluid, such as honey diluted in water. This can be accomplished by touching the tongue with a fine camel's hair brush which has been dipped in the fluid. Another method to secure eggs is to imprison the female in a bag made of muslin, or some such material, placed over the plant upon which the larvæ feed. In the case of larvæ which feed on low plants such as grasses, etc., if a small plant is transferred to a flower-pot, a covering of muslin, with the aid of two pieces of wire bent into a hoop, can be placed over the plant and the living female enclosed. It is best to have a portion of the plant touching the muslin at the top, as many species will leave the plant and deposit some, if not all, of their eggs on the muslin. If eggs can be secured through a friend living at a distance, they will travel safely through the mail. The present summer several batches of eggs were received at Ottawa from points in the Rocky Mountains, Northwest Territories and other distant localities.

If a number of specimens of the same species are being bred it is nice to have a specimen or two of each larval stage inflated, as it is important that as much of the life history as possible be preserved for the cabinet. If the first stages are too small to inflate, they can of course be preserved in alcohol, or some other fluid, or they may be dried on hot sand with some success. There are various methods of inflating larvæ, and some experience is needed before satisfactory results will be attained. Hairy caterpillars especially are difficult to inflate, but experience will teach the beginner that great care and much patience are required in order to do good work.

For inflating larvæ very few appliances are necessary, and these are not at all expensive. They can easily be had from most of the dealers in entomological supplies.

When the larva has reached the stage at which it is to be preserved the first thing to do, of course, is to kill it, and this can be done by dropping it for a minute or two into a receptacle containing methylated spirits. When the caterpillar is dead it can be taken out of the liquid with a small pair of forceps, and placed on its side on a piece of blotting paper. When this is done take a small piece of the same paper in the left hand placing it over the larva, gently pressing the front segments, with exception of head. A small sharp pointed instrument should then be inserted into the anal orifice, so as to admit of some of the liquid contents coming out. For all except minute larvae a large needle, or a pair of small forceps with curved points, may be used for this purpose. Further pressure will now be necessary in order that the remaining contents may be squeezed out. Just sufficient pressure should be applied to remove the contents; if too much is given the skin will be bruised.

When the viscera have all been removed, insert the necessary-sized glass inflating-tube into the anal orifice. The larger of these tubes have clips or spring attachments to hold the larval skin. If the caterpillar be small it can be fastened to a smaller tube by means of a thread of fine silk wound around the posterior segment. The inflating-tube can now be inserted into the rubber tube of the double bulb inflator and the empty skin gently inflated. If everything is all right it can then be placed in the oven and slowly dried. A suitable oven can be made by any tinsmith, and is simply a tin box about 6 inches long by 4 inches wide and 2½ inches deep, supported on legs to allow of the lamp being placed beneath it, and having an opening in one end to insert the larva, with another at the bottom for the circulation of air or to allow the escape of some of the heat. A sheet of glass let into the top enables the operator to see what he is doing. The drying process should be carried on over the hottest place, commencing with the front segments and working backwards. Care must be taken not to hold the same portion of the larval skin too long over the heat, but the segments that are being dried should be kept turned, so that all sides may be dried about the same time. While this is going on too much air must not be pumped into the skin; if this is done it will stretch the larva and give it an unnatural appearance.

Any small spirit lamp will do to supply the heat, which must be regulated according to the nature of the species being inflated. Too great a heat will destroy the colors of many larvæ, and this is especially so in the case of delicate green caterpillars. Hairy larvæ, as already mentioned, are rather difficult to blow, as the hairs are very easily rubbed off, and unless care is taken in the inflating the segments will be sure to expand

too much and thus be puffed out unnaturally. When the skin is ready for the oven a pair of forceps will be found a means of help in inserting the inflating-tube into the vent.

After the larval skin is thoroughly dried care should be taken in removing it from the inflating-tube. This can easily be done in most cases by simply forcing the skin off the tube by means of the thumb-nail of the right hand. The caterpillars may then be mounted on a piece of fine wire wound tightly around the pin five or six times, the lower end of the wire being neatly cut off. The portion on which the larva is to be mounted may be cut according to the size of the caterpiliar. Any good cement, such as that used for repairing insects, may be employed to fasten the blown skin to the wire.

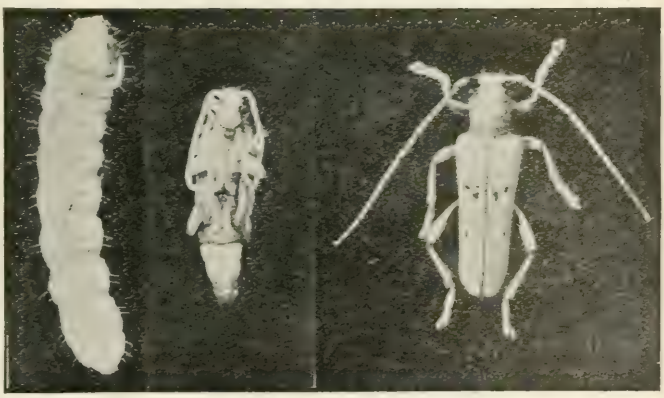
NOTES ON TWO LONGICORN BEETLES AFFECTING GROWING NURSERY STOCK.

By F. M. Webster, Wooster, O.

With the rapid changes in the flora of the country, brought about by advance in our civilization, there must of necessity come changes in the habits of such of the animal life as is dependent upon this flora for their food supply. Nor do the influences stop here, for it is frequently not difficult to observe the effects of such changes even in the parasitic enemies of these animals.

Hardly a season passes but that some old and well known insect exhibits some characteristic not before observed. Sometimes this, to us, new phase of its sociology may not again be noticed for years, or it may continue and indeed increase to such an extent as to become a normal characteristic of the species. As instances of this change of habit, the adult of the Western Corn Root Worm, *Diabrotica longicornis*, was formerly known only as a green beetle found on the blossoms of thistle and golden-rod; whereas, now, it swarms over the corn fields of the middle West in myriads, and the larvæ are one of the worst pests of the corn field. It is only within the last three years that the two ground beetles, *Harpalus caliginosus*, and *H. pennsylvanicus*, have come into prominence as strawberry insects.

The first species here considered is the coated Saperda, or the Linden borer, *Saperda vestita*, Say (Fig. 42) described in 1824, from specimens taken near the southern extremity of Lake Michigan, but was also known at that time to occur in Pennsylvania. Though common, the insect does not appear to have anywhere become seriously destructive though it was well known to Harris as early as 1832 and said by him to have been destructive to the European Linden in Cambridge, Massachusetts, in 1843 and 1844.



1 2 3

Fig. 42.—*Saperda vestita* Say; 1, larva; 2, pupa; 3, adult; all slightly enlarged.

Dr. Paul Smith, in a letter written May, 1844, quoted by Dr. Harris in his "Insects Injurious to Vegetation" gave an account of an attack upon European Linden trees in Washington and Independence Squares, Philadelphia. The trees were attacked about seven years before but within two years it had been found necessary to cut down forty-seven of these European Lindens in Washington Square alone. The American Lindens were also injured but apparently to a less degree. One of the Lindens mentioned by Dr. Harris was very large, the trunk measuring 8 feet, 5 inches in circumference 5 feet from the ground. A strip of bark two feet wide at the bottom, and extending to the top of

the trunk, was destroyed, and the exposed surface of the wood was pierced and grooved with countless numbers of holes where the borers had been bred, and whence swarms of these beetles were supposed to have issued in past times. Some of the larger limbs and a portion of the top of the tree fell down, apparently in consequence of the ravages of these insects.

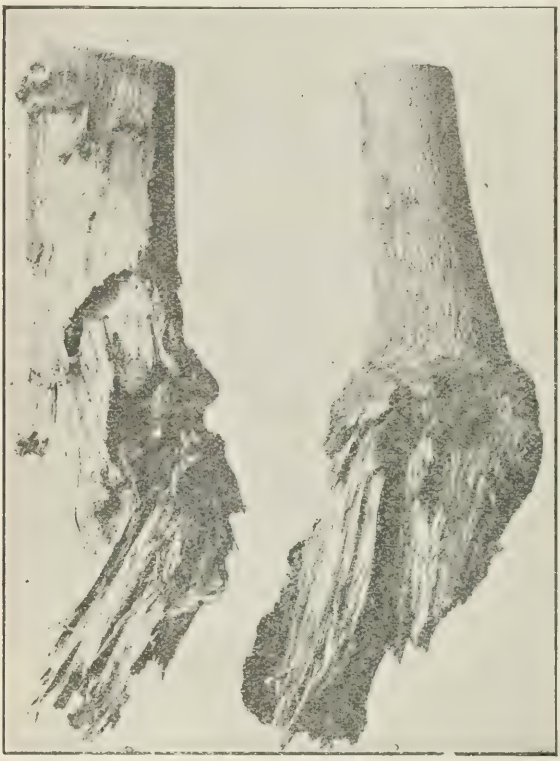


Fig. 43.—Bases of affected trees, about natural size. Original, after photographs by P. A. Hinman.

In the American Entomologist, New Series, Volume I, page 271, Dr. C. V. Riley cites the species as very injurious to the European Linden in Cambridge, Massachusetts, and Philadelphia, Pennsylvania, quoting Harris as authority, and also adds "boring at the base of young European Lindens and gouging two parallel rings around the trunk which form annular swellings." Thus it will be seen that the insect exhibits a partiality for the European Linden, but its injuries during later years do not appear to have attracted the attention of entomologists to any large degree. Last year, my former assistant, Mr. Mally, while inspecting nurseries, found a number of small Linden trees in the nursery row that had been very seriously injured by larvæ burrowing in the trunks below ground. Mr. Mally, from the appearance of these larvæ, thought they might be those of the Round-headed Apple Tree borer, *Saperda candida*, the adult of which is shown in Figure 44. These young trees growing in the nursery row were cut and transplanted to the insectary on the 28th of August. On the 15th of January, 1900, examination of these trees (Fig 43) revealed one larva still active in the rotten wood, and about four inches below the surface of the ground. On April 4th one adult *Saperda vestita* emerged. It must be remembered that this was under insectary conditions. The next day the entire lot of material was examined. One additional larva (No. 1.) and a pupa (No. 2.) were found. These larvæ had worked in the wood at the root, entirely below the surface of the ground, and, in fact, the upper limit of their burrowing was from two to four inches below the ground. When ready to pupate the larvæ evidently burrow their way upward in the wood to the level of the ground surface, or within an inch or two of it. They pupated in cells cut

Fig. 44.—*Saperda candida* Say.

diagonally across the grain of the wood at an angle of about 45 degrees to the upward channel.

So far as known to me this is the first instance of this insect having been observed attacking nursery trees, and also the first record of their working below the ground. All previous records represent them as working above the surface, their attacks being confined to the trunk and larger branches.

Dr. Harris states that the adult *Saperda vestita*, after having emerged from the trunk and larger branches of the trees, will fly into the top and there feed upon the epidermis of the tender twigs and the petioles of the leaves, often wholly denuding the latter and causing the leaves to fall. It may not be out of place to state that a few years ago a specimen of *Saperda candida* (Fig. 44) was sent me, accused of gnawing into the young growing apples, and specimens of these that accompanied the insect gave abundant evidence of the truth of the statement.

The species under consideration is said to deposit their eggs, two or three in a place, upon the trunk and branches, especially about the forks, making slight incisions and punctures for their reception, with their strong jaws. As many as 90 eggs have been taken from a single beetle. The larvæ, hatching from these eggs, undermine the bark to the extent of six or eight inches, often penetrating the wood an equal distance.

This appears to be an instance of an old and well known species taking on a new habit, as I can find nothing on record of their having ever been before observed depredating in the nursery row, and there is certainly nothing on record relative to the larvæ working below the surface of the ground.

The second species, with which this paper has to deal is *Oberea bimaculata*. While this is, perhaps, more of a small fruit than a nursery pest, nevertheless, we have come in contact with it in our nursery inspection, although not especially as affecting nursery stock. In Bulletin 96 of the Ohio Agricultural Experiment Station, pages 20-22, I gave an account of this insect and stated that we had reared it from witch hazel *Hamamelis virginiana*, also from apple twigs. The specimen is shown in Figure 40. A further study of this insect has shown that it is *Oberea tripunctata*. Specialists make this a variety of *bimaculata*. Since this work was done, I have twice reared the true *Oberea bimaculata* from raspberry, which it is known to infest. There seems now to be a dividing line between these two forms, *tripunctata* having a variety of food plants, while *bimaculata* appears to confine itself to canes of *Rubus*. The object in presenting this matter is to correct a possible error in Bulletin 96, in terming the species there reared from witch hazel and apple twigs, *Oberea bimaculata*, without further qualifications. Although as stated, the two are considered to be the same species by systematists the rearings at the Station imply that there is a sharp distinction between the two in the matter of food habits, and it seems to me that this would be very strong evidence at any rate, that may, some day, be used in separating the two insects. Any one wishing to follow up our studies of these species will find them recorded in Bulletin 96, of the Ohio Agricultural Experiment Station, pages 20 22, and the Journal of the New York Entomological Society, Volume V, pages 203 204, with illustrations, and Volume XI, pages 437-438 of Entomological News. It will be a very interesting study, and one fraught with some economic importance, to carry on a large number of rearings, both from *Rubus* and other plants. If this food distinction between the two forms holds good throughout, *Oberea tripunctata*, Swederus will be entitled to rank as a species.

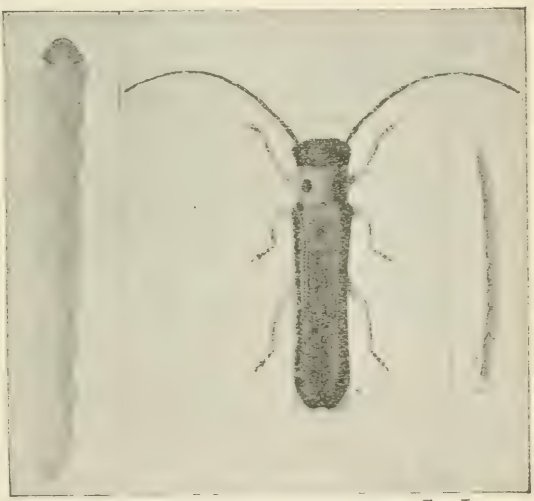


Fig. 45.—*Oberea bimaculata* var. *tripunctata* Sw. Larva enlarged at left; Section of excreta at right, all enlarged.

A very valuable contribution to our literature upon these insects will be found in Bulletin 23, Agricultural Experiment Station, Cornell University, pages 120-24, by Professor Slingerland. The two forms are so exceedingly alike in appearance that none but expert entomologists have been able to separate them. As relating to this matter Mr. F. H. Chittenden, Assistant Entomologist in the Department of Agriculture, wrote me Feb. 8th, 1899, also stating that he had been unable to avoid the impression that the two insects were distinct, notwithstanding the opinion of specialists to the contrary. I speak of this more in the way of a suggestion, as it seemed to me a problem which a careful entomological student may well take up and solve.

HABITS OF THE LARVÆ OF DERMESTES TALPINUS (MANN.)

By Percy B. Gregson, Waghorn, Alberta.

To fur trappers in the far North West the larva of this beetle, which Dr. Fletcher has kindly identified for me, is but too well known. (Fig. 46.) It seems to be ubiquitous and almost omnivorous. Hitherto, however, it has been understood to feed only on dead things, such as fur hide, skin, bacon, wool, dead insects, etc., but in rearing it, as I have in considerable numbers, I have noticed features which show the larva in its very early infancy to be endowed with a very extraordinary activity, or to be a parasite of living insects. These features I should like now to record.

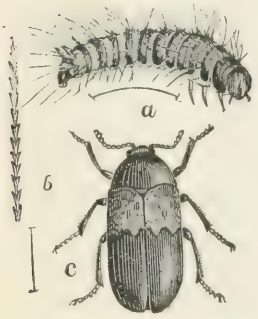


Fig. 46 represents the beetle and larva (magnified) of *Dermestes lardarius* — a most familiar species.

My practice when spreading lepidoptera is to place the setting-boards within a box with closely-fitting door, but the frequent destruction of the insect by the Talpinus larva, before the insect itself had become sufficiently set for removing, determined me to investigate the early existence of the larva. I noticed that the butterflies I caught in May and early June (*Colias occidentalis*, *E. discoidalis*, etc.) were peculiarly liable to attacks by this pest. Others caught later in the year were free from them. When I discovered the larva on the setting-boards (generally on the second or third day after setting the insect) the largest of the larvæ did not exceed one line in length, and from the dust-like frass under the body of the butterfly and the excavation made in the body, the larva had evidently been at work for some time. It being easily possible for such minute creatures to have crept through some small crack into the interior of the box, I decided this year (1900) to rear a few, as soon as I could get any, in a tightly closed tin tobacco box three inches deep, for I found they could not crawl up the tin sides of such a box. They cannot crawl up tin at any slope greater than 30 degrees. Placed on the higher part of such a slope, they slide down to the bottom.

On the 12th of May, 1900, I found a *D. talpinus* larva on a hybernated specimen of *Vanessa cardui* which I had captured and spread on the 10th. This little larva (not a line in length) I at once placed in the empty tin tobacco box, with the carcase of the *V. cardui*, and closed the lid and saw that there was no space for ingress of even the minutest insect, assuming that it first could scale the tin sides of the box. Being much occupied for the next few days, I simply added a Colias or two (caught in the manner I shall presently describe) without disturbing the little grub which was within the carcase of the *V. cardui*. On the 25th May I introduced to him a *Colias occidentalis* caught that morning. I always carry with me when hunting near home for lepidoptera, a shallow ($\frac{1}{2}$ inch deep) tin cigarette box whose lid fits very tightly, requiring an effort in fact to open, and into this box I at once place, direct from the net, my captured specimens, folding them in papers on the spot (first, however, killing the Colias, Erebias and such sized insects by pressure on the thorax in the net) and it is therefore impossible for

any foreign insect to gain access to the interior. I followed this course on the 25th May, and the *C. occidentalis* I introduced to the Talpinus larva I took direct from its paper in the shallow box, as I did all the insects with which I fed my Talpinus, and dropped it into the larger tin box. On exploring the interior of this box in the evening of the 25th I found a second Marmoratus larva (very minute) feeding on the body of the newly introduced Colias.

On 28th May I introduced another *C. occidentalis*, caught under and treated in precisely similar fashion to the others above mentioned, and soon afterwards observed a third little Talpinus larva on the bottom of the tin box. There were now three of these larvæ, and for the first time I introduced to them a small piece of coyoté fur. This, however, was not touched until the carcases still remaining had been devoured, and there was no further increase in the family. On the 4th June, however, I placed two more fresh *C. occidentalis* in the box (both caught as before) and as I had now become accustomed to mysterious additions to the family I presently observed without surprise a minute Talpinus crawling from just under the right wing of the last introduced butterfly. Here then were four larvæ, all of which had been obtained through freshly captured butterflies, and none of which could have possibly crawled into the deep, close-lidded tin box, nor can I imagine that they could by any possibility have gained admission to the shallow tin collecting box and to the folded papers within, unless they were already on the bodies of the butterflies when captured. In which case their activity seems little short of marvellous.

Although on subsequently ceasing to feed the larvæ with butterflies they ate the fur hide, they nevertheless deserted it again for bodies of insects when I once more introduced that kind of food. I have even found one in the dead body of a common house fly.

In closing these few remarks I may add that I procured a dozen of these larvæ from butterflies in the above described fashion this year. The first to pupate did so on 7th July and hatched on 9th August.

OBSERVATIONS ON SEVERAL SPECIES OF DERMESTIDÆ.

By F. M. Webster, Wooster, O.

The necrophagous habits of many of the species of this family of insects are well known, but it is doubtful if the phytophagous habits are very much less emphasized in other species.

Byturus unicolor Say, is, perhaps, best known as the Raspberry Fruit beetle, and I have observed it feeding, usually in pairs, on the blossoms of *Geum*, either *rivale* L, or *album* Gmel. *Byturus tomentosus* Fab., is destructive to the Raspberry in England.

The common introduced species, *Dermestes lardarius* Linn., while affecting dried skins, meats, etc., is also fond of bread and other grain products, and has twice been reported as destroying honey comb. *D. vulpinus* Fab., has been reported as damaging tobacco.

Perimegatoma cylindricum Kirby, var. *angulare*, has been reported as a possible enemy of the Fluted scale, *Icerya purchasi* Maskell.

Attagenus piceus Oliv., has become so destructive to woolen fabrics and carpets as to receive the name of Pitchy or Black Carpet-beetle. It has been sent to me from Indiana breeding in beet seeds, larvæ, pupæ, and adults all being present in the seeds when received.

Trogoderma ornatum Say, though beyond a doubt a museum pest, is a vegetable feeder as well. From the seed of the garden sunflower, collected May 28, 1899, this beetle emerged, in the insectary, June 17, 1900. From seeds of *Ambrosia trifida*, collected October 10, 1899, a specimen emerged in the insectary, May 19, 1900. From seed cluster of *Euthemia graminifolia*, collected October 12, 1899, beetles emerged in the insectary, March 31, 1900. These seeds were infested by unknown larvæ when collected.

Anthrenus scrophulariæ Linn, so well known as a carpet beetle, I have, for years, found in abundance during early spring, in the blossoms of the Tulip, and almost invariably in those of a pure white color, or nearly so. I fully believe that this is more

of an out of door insect in this country than we at present suppose, though we know that, at home in Europe from whence we received it, the insect is unknown as a household pest.

Anthrenus varius Fab., I have taken in the blossoms of Tulip, in connection with the preceding, and also by itself in the Peony blossoms in June. A single individual was found in a breeding cage, supposed to be secure against the ingress as well as the egress of the smallest insects, in which were thorns of the Honey Locust, infested with lepidopterous larvæ. Of course, in this case, the beetle might have made its way into the cage, though the probabilities are that it did not. I have reared either this species or *A. musæorum* Linn., from masses of spiders' nests mingled with the bodies of dead insects, as well as the living, in hibernation, under the loose bark of a hickory tree.

NOTES ON DANAIS ARCHIPPUS.

By C. W. Nash, Toronto.

During the past season (1900) I have made the following notes of the movements of this butterfly in the neighbourhood of Toronto :

June 14th.—Saw first Archippus butterflies. There were three of them loitering over the willow bushes near the shore of Lake Ontario. They were much faded and ragged ; all of them were flying eastward.

June 20th.—Archippus butterflies are now common. All are very dull coloured ; their scales being worn off and wings ragged, they look old.

July 21st.—I examined a large number of Asclepias for Archippus larvæ, but found only one, about half-grown. The butterflies are common, but all seen are dull and worn.

July 22nd.—On a small patch of Asclepias, near my house, I found a number of Archippus larvæ of various sizes, some very small and ranging up to full-grown ones ; also found several chrysalids.

I watched several of these chrysalids for some time, but not one of those I kept under observation produced a living butterfly. In each case the insect reached the perfect stage, or nearly so, and then died in the shell. None of these appeared to be parasitized ; they simply dried up.

August 5th.—Archippus butterflies are now congregating about the trees near my house, where they roost ; some of the flocks contain over one hundred. These are all large, bright coloured specimens, evidently produced this season.

September 4th.—Archippus butterflies were streaming along the lake shore in myriads all this afternoon. I travelled through the flock for about five miles, and in that distance there was no break in the flight ; all of them were flying westward. At times individuals would alight on the ground, always with their heads pointing westward. They seemed generally to select a shady spot to alight on, and in some places the ground was covered with them. After resting a few minutes they would get up again and go on with the flying crowds. The wind was from the north-west, very light, in fact scarcely perceptible.

Just at sunset I visited the trees they frequent near my house and found a great many roosting there.

September 6th.—Very few Archippus butterflies about to-day.

September 7th.—Only saw a few individuals.

September 28th.—Saw a few Archippus butterflies to-day, perhaps half a dozen.

October 6th.—A few Archippus still about.

Prof. Comstock and some other entomologists say that no birds will eat the D. Archippus. This is a mistake, so far as the butterfly is concerned, for I have myself taken them from the stomach of cuckoos. So far I have not identified the larvæ in the stomach of any bird, and it may be that they are never eaten by them.

[At London, Ontario, this year the Archippus butterfly was seen as late as November 2nd. A specimen captured on the 27th of October lived for over a fortnight in the Society's room and died apparently from a chill, as it had been left on the windowsill one cold night.]

THE PRESENT STATUS OF THE SAN JOSÉ SCALE IN ONTARIO.

By Prof. Wm. Lochhead, Guelph.

It will be remembered that the Government relaxed its strong policy of extermination in May of 1899, owing to the great opposition which was encountered. Nothing was done by the owners of the infested orchards to prevent the spread of the scale until the spring of the present year, 1900, when the Government came to their help and offered to provide whale-oil soap and crude petroleum at half price. While many orchard men took advantage of the liberal offer, it is yet a regrettable fact that many failed to buy soap or crude petroleum, or to use any other remedy. Inspection of the treated orchards, moreover, reveals the fact that the spraying was often done carelessly, or too little of the soap was used per tree. As a result of such careless treatment the scale is even more abundant at the close of this season than it was at the close of last season and the infested trees are more plainly detected. It may be said with a great deal of truth that in the infested areas of Guilds and Niagara no orchard is free from scale, and orchards which had not more than ten per cent. of the trees marked for scale last year have now scale on nearly every tree. While careless treatment has done so little to check the spread of the scale, yet some good results have been secured by careful spraying with good whale-oil soap and crude petroleum. Where whole blocks were treated carefully the intensity as well as the spread has been checked appreciably, and some of the best fruit was picked from trees which had been marked for one or two years.

In the Niagara and St. Catharines districts the owners are, as a rule, indifferent, and the impression seems to have spread that the scale is not any worse, if as bad, than some other evils against which the fruit-grower has to contend, and which are infesting orchards, such as *Yellows*, *Rose-Leaf*, small peaches, *Blight*, etc. A cursory inspection fails to show many apple trees which have given way, but many dead limbs can be found, as well as many dead peach trees.

In the Guilds district, Kent county, the scale has gained great headway and moderately infested orchards of last spring are now badly infested, for no spraying was done to check the progress of the pest. There, however, the owners are beginning to realize the necessity for action, and several have already purchased spray pumps and are preparing to combat the scale with vigor this coming winter and early spring. Time is evidently required to educate the fruit growers to give their orchards proper care.

It is difficult to state with any degree of certainty the extent of spread of the scale to new districts since the work of inspection of orchards was discontinued. Two new locations, however, have been discovered accidentally—one noted in London East by Mr. J. Dearness, and another at Essex Centre by the writer. The latter case was a very severe one, and it is probable that the scale has spread a considerable distance from this new centre.

Opinions differ as to the relative merits of good whale-oil soap, and crude petroleum. Some consider the latter a too dangerous remedy to be applied by careless sprayers, and prefer to continue the whale-oil soap treatment. Others, again, maintain that crude petroleum has given better results, both in controlling the scale, and in invigorating the trees. As a result of the experiments this year some valuable points have been gained. The whale-oil soap must be of a certain standard of quality to give results at all effective, and in the application of the crude petroleum good results depend on the method of spraying—i.e, in the handling of the nozzle, rather than on the percentage of oil, as Mr. G. E. Fisher has already explained to this meeting.

A PARASITE OF THE SAN JOSÉ SCALE.

By John Dearness, London.

Last year I received a packet of twigs bearing scale insects, mostly San José, from Mr. John Gordon, Guilds P.O., Kent Co., on some of which there were parasitic mites preying at least on the well-grown females of the species of scale insect named. On some

specimens received this year from the same neighborhood these mites were very numerous. I mounted some specimens and with a female S. J. put them in the Society's collection of microscopic slides. As many as eighteen larval mites were observed under one large scale.

Mr. N. Banks, Washington, a well-know expert on mites, reports it *Tyroglyphus malus*, Skinner, which is known to prey on the larvæ of the oyster-shell bark louse. Dr. Howard writes that J. Lignières published a valuable article on this mite in the proceedings of the Societé Zoologique de France in 1893. The habits of the mite are given accompanied by excellent anatomical figures.

"The San José scale is spreading very fast this year" in Ontario. This statement was made again and again last season, and it is repeated this year. Some people who have heard it, have inferred that since the suspension of the cutting and burning of affected trees the insect has multiplied at a more rapid rate than formerly. The discovery of new areas and new locations of infestation does not prove that the scale has increased abnormally last year and this one. That the pest was not in these newly discovered infestations in 1898 or in previous years is only an assumption; to say that the township or even the orchard was inspected in that year does not by any means prove that the scale was not there.

The officers' assurance in 1899 that the scale was well-nigh "surrounded" was based on the belief that by tracing the deliveries of stock from the few infested nurseries all initial points of its distribution could be located. The possibility, nay the probability, of a more general introduction may be reasonably suspected from a consideration of the methods adopted by some nursery agencies. For several years past, as a county school inspector, I have received one or more circular letters asking for a list of the addresses of the teachers in the county, the reward usually offered for the trouble was one or more young trees or flowering shrubs. The teachers whose addresses were thus obtained were urged to do some canvassing in their respective neighborhoods, or, in some cases, to send a list of orchard owners or probable purchasers in consideration of a like reward to that just mentioned. The badly infested New Jersey nurseries were as likely as any others to supply stock to the jobbers who sought to use the teachers as distributers of it.

In addition to the stock imported and scattered all over the country by jobbers there is no doubt that individual farmers here and there imported young trees direct from the nurseries. Dealers would not put and keep their advertisements in the papers without seeing some benefit from them. These are some of the facts to be considered before accepting the conclusion that all or nearly all the centres of infestation in Ontario were known in 1899 and that new ones are due to the interruption of the methods in operation in the spring of that year. Incalculable good came from the tracing and destroying of affected nursery stock. Upwards of a hundred centres of evil were thus probably rendered harmless. All that the San José scale has cost Ontario has been doubly and trebly repaid by this action alone. On the other hand harm came from the sense of false security begotten of reliance on the reports of immunity based on a superficial examination of the orchards in the fruit growing townships.

The hope for the future successful disposal of the scale-insect difficulty lies not in legislative intervention but in education. Every farmers' institute and every schoolhouse should be a point from which light should be thrown on the nature, life-history and method of treatment of our insect and fungal pests. Lessons on the scale insects could be made as useful and made to yield as good training for the observing and reasoning powers as an equal number of lessons in spelling, algebra, arithmetic, etc.

In August Rev. Mr. Seaborne discovered an infestation of San José scale in London East. In September Mr. Ellwood of St. Thomas sprayed the trees with a very dilute solution of coal-oil to which some common salt was added. He claims that the salt makes the solution more effective against the insect without correspondingly endangering the vitality of the tree. I visited the place twice since Mr. Ellwood's treatment. The leaves of the sprayed trees were injured more or less, but I found no living scale. On one branch I took away there were two females found which did not appear to be dead. On a branch taken subsequently no living scale insects were found. The developments of next spring will tell whether the treatment is effective.

THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.*

The twelfth annual meeting of this society, which was founded in Toronto in 1889, was held at Columbia College, New York, on the 22nd and 23rd of June, 1900. In the absence of the President, Prof. Bruner, the chair was taken by the Vice-President, Prof. C. P. Gillette, who read an address on "the objects of the Association of Economic Entomologists." The first of these is "to discuss new discoveries." This implies, the speaker said, that new discoveries are to be made. It takes for granted that the members are to be scientific workers and not mere book students, content to thrash over old straw or to step exactly in the footprints of another. After referring briefly to Dr. Riley's "introduction of the Vedalia to the relief of disheartened fruit growers" in California, and to Dr. Howard's having made possible the successful culture of the fig through the establishment of *Blastophaga grossorum*, he stated that it would be difficult to find so small a body of workers, with so meagre an amount of time to be devoted to original research, in any other science who can show larger results in the way of new discoveries in so short a time.

A further object is "to exchange experiences and to carefully consider best methods of work. No one can be a toiler in any special line for a year without encountering experiences that might be related to a fellow-laborer to his profit. We are scattered over a large territory, having widely varying conditions of climate, altitude, and plant and insect life. Each can bring from his particular field some points of peculiar interest to all the others. While we may read one another's publications and perhaps exchange frequent letters until we almost feel acquainted, it is only occasionally that we can enjoy these meetings together, and it is a great inspiration to talk freely over one's experiences and plans of work face to face with those who are interested with him in similar lines of labor."

"The student of applied entomology is supposed to have a good general knowledge of agricultural affairs, particularly in regard to plant growth. He must be informed upon all the insecticide materials and be able to tell what insects they are suited to kill, in what strength they may be applied to different plants, what their physiological effects will be on both plant and insect life, and when they can best be applied. He is supposed to be able to tell at a glance what any insect is that may be handed him, and whether or not it is injurious or beneficial. He is expected to be able to recommend the cheapest and best pumps or other machinery for the application of insecticides. Is it any wonder that we need to get together and exchange experiences and discuss methods of work, particularly when we remember that different results are obtained in different localities? Lime, salt and sulphur, so valuable for the destruction of San Jose scale on the Pacific coast, were found to be of very little value in the moist atmosphere of the eastern portion of the country; the codling moth, said to have one brood in Maine, is reported to have two in Colorado, and three or four in other places; insects fairly common but never seriously abundant in one portion of the country are often found to be great pests in others. In view of these conditions it is important that we obtain all the ideas possible from fellow-laborers in different localities, that we may make as few mistakes as possible, and that we may not bring down upon ourselves the distrust of those whom we labor to benefit."

"We are also 'to consider best methods of work.' Method is always important, and particularly is it to be sought for in a young science or industry where long experience has not yet determined the best plans of procedure. It was well at first that a large amount of individuality should enter into the work and a variety of methods be employed. Then, by a process of natural selection, the poorer methods would gradually drop out and the better ones be retained. It is time for this Association to lay aside its swaddling clothes and assume the garb of maturer years. It should be one of its objects to determine upon best methods as soon as expedient to do so. One recommends Paris green or London purple in the proportion of 1 pound to 200 gallons of water, while another will make it one pound to 160 or even 100 gallons for the destruction of the same insect. One recommends two sprayings for the codling moth, another three,

* The Editor desires to acknowledge his indebtedness to the official report of the proceedings of this meeting published by the U. S. Department of Agriculture.

and another says spray often enough to keep the fruit covered with a layer of the poison, so as to be sure of killing the second brood. Some advise hellebore for the pear slug, while others prefer one of the arsenites, and still another would use quicklime or simply road dust. Surely there is need for more method and uniformity in our work and in our recommendations for the control of particular insects. By free discussions at these meetings much can be accomplished to this end."

The next object laid down is 'to give opportunity to individual workers of announcing proposed investigations, so as to bring out suggestions and prevent unnecessary duplication of work.' "This brings upon us the importance of systematic co operation in our investigations; it has been often urged upon us, but not much progress has been made. One of the chief difficulties is that each one wishes to plan his own experiments and publish the results, in order that he may not have to share honours with another. Such a feeling is not altogether to be condemned; neither is it necessary to so plan our co-operation as to make it essential to remove credit from him to whom it belongs. Let us suppose two entomologists are planning independently to test the effect of insecticides upon foliage. Each carries through his experiments and publishes the results of his labors. They are still independent experiments, the results of one not supporting or contradicting to any great extent the results of the other. Had each known what was being planned by the other, they could have arranged to carry out their experiments so that they would be largely duplications of each other, and when the results were published we should have double evidence upon the points under consideration where results agreed; and where they disagreed, we might be able to find in the different conditions the reason for it. Such a co-operation would bring results of far greater value than those obtained by independent experimentation, and neither party would lose any glory; in fact, each would receive more credit because of the better conclusions that could be drawn from the work. And then how carefully every conclusion would be reached and backed by positive proof for fear that the other party might get different results! Such duplication as this is of the utmost importance to establish scientific truth, and the more we can have of it the better. It is only the 'unnecessary duplication of work' that our constitution deprecates."

"It is frequently the case that one is working out with considerable care the life habits of an insect, and a little information from exact observations upon some particular point in other localities would be of great service to him. The person giving the information would have full credit for what he did, and the world would have the benefit of the combined results. When time can not be taken by the head of a department for this aid, it may often be the case that a special student in entomology would be glad to get his name into a bulletin for doing a little good work. I have a case in mind to illustrate. The speaker is working on the life history of the codling moth. His observations make him wonder how it can be possible that there can be so few as one brood or so many as three or four anywhere. He would be greatly aided if a few entomologists in different parts of the country would make the following observations and report results this year. First, obtain date of blooming of the earliest apple trees. Second, determine the time of appearance of the first moths of the second brood by collecting a few of the earliest wormy apples and rearing the moths from them. Third, determine when the brood of worms that go over winter without pupation begin to leave the fruit. This can be done by placing cloth bands on the trees about July 15th, and removing the larvæ that appear under them once a week until those have been taken that do not change to a chrysalis within a short time. Then, with the other facts that have been well worked out, it will be possible to state with considerable definiteness the number of broods in different portions of the country."

The speaker next referred to the importance of having at each Experimental Station as complete collections as possible of insects in all their stages that are serious pests, and said that the only way in which this could be accomplished was by a system of mutual exchanges. After speaking very briefly on the third clause of the constitution 'to suggest, when possible, certain lines of investigation upon subjects of general interest,' he went on to the last clause, 'to promote the science and advance the study of entomology.'

"The usefulness of any applied science depends upon man's knowledge of the natural laws operating in that science. An astronomer could not determine the very day, hour, and minute when an eclipse of the sun would be visible at a particular spot on the earth's

surface, or the exact date of the return of a comet, if he did not thoroughly understand the operation of the laws by which these marvellous phenomena are brought about. Neither can applied entomology accomplish its highest mission in the world for man's benefit until he succeeds in thoroughly working out and interpreting aright the laws which prevail in the insect world, and they are many and intricate, and some of them difficult of solution. Whatever we can do to interest others in the study of insect life, in any of its phases, to the end that new facts are recorded, will help to the more perfect understanding of our favorite science and consequently to its usefulness. We are greatly indebted to the pure systematist in entomology who never attempts to make a practical application of his knowledge."

"It would greatly promote the science of entomology if each member of this Asssociation would make a special systematic study of some groups of insects, however small, and publish the result as a personal contribution to the pure science of entomology. We would be better workers in economic problems for so doing. A study of the habits of insects in nature's laboratory fits one for a grade of systematic work that he never could attain as a closet naturalist."

"A knowledge of food plants, of broods, of local variations, and of variations occurring among the offspring of a single pair, determined by careful observation in nature's haunts or by breeding in the laboratory, is as essential to enable one to establish true specific differences as is a thorough knowledge of structural character."

"To promote a science it is necessary to make known its relations to human interests. If men can be shown that their health, wealth, or happiness depends upon a knowledge of insect life, there will be no trouble to interest people in the study of entomology. Show the farmer, the gardener, and the horticulturist the importance of knowing the habits of insects in order to successfully combat the pests that destroy their crops; bring to the attention of the preacher the inexhaustible fund of evidence and illustration with which to teach his flock the power, wisdom, mercy, care, and omnipresence of the Creator of all; make known to the artist the boundless field which a study of insects opens to him for the display and developement of his powers in portraying graceful and fantastic forms and in preparing and blending colors of the most exquisite beauty and harmony; teach those that instruct the young what a wealth of interesting and easily obtained objects are always at hand from insect life with which to fascinate the child and secure his lifelong interest in natural history study; make it plain to all that the very laws of life that prevail in the higher realm are equally patent among the creeping, crawling creatures of lower rank and smaller size—do all this, and the science of entomology will quickly take the rank it deserves among its sister sciences."

"In closing let me urge that we keep in mind the worthy objects for the promotion of which we are banded together. Let us keep the standard of work up to the ideal conceived by those in whose minds the organization had its birth. Let us show a willingness to sacrifice self-interest when it is necessary for the general good, and let us do all in our power to preserve and strengthen the fraternal feeling that has ever existed among our members."

In a subsequent discussion of the address, Prof. Webster said that there were very many features in it of vital importance to working entomologists. One thing he considered entitled to especial emphasis and that was the matter of duplication of work. The fact that one member was working upon a given species in one State or Province and another member was working upon exactly the same species in another region of country, while apparently a duplication of work is not really so, because in all probability very different results would be obtained. No two men see the same thing in the same light, and climate, latitude and elevation also have a great deal to do with the action of insects. As to the matter of mapping out work, it must be remembered that most entomologists are llmited in their powers, and, while they can plan work, it is not always easy to carry it out, as a station director or a board of trustees might greatly revise his plans. In regard to the introduction of foreign parasites, it seemed to him that it is a field we are just entering, with the future all before us, and there would be many failures; but where such work was carried out carefully he believed it might prove successful with respect to a great many introduced species of insects. When we come to carry it out between States, how

ever, other difficulties will surround us. He went to a great deal of pains to obtain from Professor Morgan an egg parasite of Murgantia, and after getting it established, it was swept out of existence during the winter of 1898–99, and no good has come from the introduction. He was also of the opinion that a great deal could be done by an exchange of experiences with insecticides, such as had taken place in the morning session, as insecticides seldom have the same effect in different portions of the country. It had always seemed to him that the work of the economic entomologist was very largely to work out life histories, and after he had done this and had found out methods that could be used to destroy the insect his duty ends and the work of the horticulturist and agriculturist begins. He did not think it ought to be necessary for an entomologist to make of himself a mechanical, hydraulic, or civil engineer.

Prof. Fernald referred to the remark just made by Mr. Webster to the effect that no two men saw the same thing in the same light, and said that the same was often true in listening to an address, for generally no two men got the same ideas from it. For him other parts of the address than those mentioned by other speakers had presented themselves with particular force, and especially those with reference to collections in connection with the insectary or entomological work of any kind. It seemed to him that the work of a station whether connected with a college or not, is most emphatically educational, for even if it be not educational to students or visitors, it is certainly educational to the workers at the station themselves, and by continually adding to such a collection they are adding to their education as well as to the education of the residents of the region. He had thus far found a great demand for collections rather different from those ordinarily met with. The ordinary collection contains the rare insects as frequently as it does the destructive ones, and by that he meant to uphold the question that was raised in the address with reference to how many of the common insects could be found in different collections. He suggested that, so far as his own experience goes, there are too few collections in which all stages are preserved in connection with the work that insects do. A large part of the material that he receives in Massachusetts does not contain any insect whatever, but simply a sample of the work of the insect which has either escaped from the box or was never inclosed. The problem in such cases is to tell what has done the damage by the damage itself. He found that his greatest help was to preserve specimens of the insect and of the work it was doing, and he used such specimens in the identification of material sent in, perhaps fifty times as often as any other specimens. Our collections, in his opinion, should be amplified along the lines of early stages and the work done by the insects, and such collections will appeal strongly to the people. The whole address was interesting and suggestive, but it was this feature which interested him most. He had also had experience with the Murgantia parasite obtained from Louisiana by the kindness of Mr. Morgan, and while he was now fortunate in not having Murgantia to deal with, it was a great relief, while searching around, to find that there was some one who could assist him, and he thought anything in that line should be encouraged, for when a man wants a thing of that sort he wants it badly.

Mr. Johnson said there was another important suggestion implied in the address, and that was the commercial side of entomology—if the term might be permitted. We have enough systematic entomologists at the present time, and perhaps enough economic entomologists, but we do need another lot of men who will take up purely the œcological side; that is, they must study conditions in the field. The day is coming, and is not far distant, when our great commercial railroads and some of our greatest manufacturing concerns, such as canneries, will employ œcological entomologists just as they employ engineers and other skilled labor. He felt quite certain that this would come about, and that a new field would open to young men especially, who would take up this commercial side of the entomological problem. To give an illustration of what he meant, he said he would try to bring this out in a paper which he would read on the following day on the subject of the pea louse in Maryland, which has destroyed more than $4,000,000 worth of green peas along the Atlantic coast this season.

When insect injury touches the pockets of the producers to that extent they are going to look about for the men who have a knowledge of the insects. It means money to them. He had been in consultation with some of the high officials of one of our principal railroads, and felt certain that the day is not far distant when these roads will employ men to take up the entomological study and development of the territory through

which their lines run. He considered this an important point for the student of entomology to bear in mind. Of course such a man must go out and study conditions over a vast area. He must also know what our worthy chairman is doing in Colorado; what Mr. Weed is doing in New Hampshire; what Mr. Lounsbury is doing in South Africa; what Dr. Fletcher is doing in Canada—in short he must keep posted on the entomology of the whole world and be ready to meet any emergency.

Prof. Hopkins said that he found in the spruce forests of Maine that a large timber concern controlling some 300,000 acres employed a practical forester and scientific man, and paid him about $1,500 a year, to give advice on practical methods of cutting timber and making surveys. The concern mentioned sent this man with the speaker through the spruce forests of Maine to learn all he could about forest insects. This was another evidence of the fact that the practical men are beginning to realize that they can very profitably make use of the results of scientific research.

A vote of thanks to the chairman for his interesting and suggestive address was unanimously adopted.

Dr. L. O. Howard, in the first paper, detailed the operations performed in the introduction and establishment of the *Blastophaga* in the fig plantations of California, which had been carried on since the last meeting. The paper will be published in full in the Year-book of the U.S. Department of Agriculture for 1900.

Establishment of a New Beneficial Insect in California.

A second note presented by Dr. Howard also related to the introduction of a beneficial insect. He stated that it would perhaps be remembered that at the tenth annual meeting of this Association he had referred to his efforts to introduce and establish in this country, with the assistance of Prof. Antonio Berlese, of Italy, the interesting Oriental parasite known as *Scutellista cyanea*. In Italy this curious parasite occurs commonly in the wax scale (*Ceroplastes rusci*), and it was introduced into Italy in all probability from the Orient about forty years ago, although originally described by Motschulsky in 1859 from specimens reared by Nietner in Ceylon from *Lecanium coffeæ*. The living specimens were sent by Dr. Berlese and his colleague, Dr. Leonardi, and were colonized at Baton Rouge, La.; also in Washington D.C., in the insectary of the Division of Entomology upon *Ceroplastes cirripediformis*. The Washington specimens did not succeed in perpetuating the species and nothing has been found since of the Louisiana material. A year later Mr. C. P. Lounsbury, government entomologist of Cape Colony, found this species parasitic upon *Lecanium oleæ*, the common black scale, in Cape Colony, and sent specimens to the writer for identification. The past spring, Mr. Lounsbury, at the writer's request, made formally through the United States Secretary of Agriculture to the Secretary of Agriculture of Cape Colony, brought with him from Cape Town to New York two boxes of twigs covered with the black scale affected with this parasite, and expressed them to Washington, whence they were immediately forwarded to Mr. E. M. Ehrhorn, the horticultural inspector of Santa Clara County, Cal. On June 19 the writer received a letter from Mr. Ehrhorn announcing the arrival in living and healthy condition of the parasites in question. The twigs in one box were somewhat mouldy but quite a number of parasites were crawling about in the box and were found in the pupal condition in some of the scales. Mr. Ehrhorn had been warned by telegraph and had prepared twenty-five infested oleander plants by potting them and had covered each with a tight bag of the finest Swiss muslin. In these most of the parasites were liberated and a few were allowed to fly in the orchard. Specimens of a hyperparasite (*Tetrastichus* sp.) also survived the journey, but Mr. Ehrhorn was on the lookout for this parasite and isolated them as they appeared, pending instructions from Washington as to their destruction. The writer had strong hope of the successful establishment of this species at San Jose, the climate being appropriate and the supply of food unlimited, and stated further that this was another instance of international entomological work which emphasized the fact that this Association through this class of work binds together its members all over the world more than any other association.

At the opening of the discussion on the paper, Dr. Howard said that he would be glad to hear from Mr. Lounsbury on the subject of this parasite of the black scale. He

said he wished to add that Mr. Lounsbury had sent two boxes, one a deep box and the other a shallow one. The shallow box carried the more successfully; the scales had begun to rot in the deep one.

Mr. Lounsbury stated that the history of the case dated back to his first arrival in Cape Colony. Before he had been there a year he noticed that the black scale was not injurious, and upon travelling about the Colony he found the same condition true over many thousand miles of territory. Later, upon obtaining specimens of the parasite and corresponding with Mr. Howard on the subject, the latter had suggested his sending it to California. For four years he had been watching for an opportunity to get a sufficient number of parasites to send, but the scale is so well kept in check by the parasites or by other factors, that until this year he was unable to find a large quantity. Last year he mentioned the matter in his annual report; a copy of which he had sent to Mr. Ehrhorn, who at once wrote and asked him to take steps to get the parasite established in California. He replied that he would gladly do all he could, but would like Mr. Ehrhorn to make it a formal matter so that he might be able to spend the time and money necessary. This was done and Mr. Lounsbury received formal orders to go ahead. He set about it in two ways: First, he had scales collected and reared young larvæ from them, which were placed on young oleander trees now being kept in the Cape Town gardens. Primary parasites were to be admitted to the plants, but secondaries excluded. These plants in time he may be able to send to the United States in Wardian cases. Second, while waiting for these to develop he had Mr. Mally go out and search the country side, with the fortunate result that relatively large colonies of scale were found where Mr. Lounsbury had seen small colonies the year before. Mr. Mally collected for nearly a week and brought in over a bushel of twigs which were carefully sorted, cut into foot lengths, and the ends dipped into sealing wax. The twigs were then wrapped in tissue paper. The matter of the differently shaped boxes was purely accidental. He went to the grocery shop and picked out what he thought would be best suited, taking one shallow box and one deep box in order to try them. He thought that packed in the manner above described and placed in a wooden box, what moisture came would be absorbed by the wood. The boxes were packed the night preceding Mr. Lounsbury's departure, the deep box being placed on a dry shelf in the fruit room of the Cape steamer and the shallow box kept in the stateroom. In this way the insects were taken to England, which he hurried across and took the next liner. He then tried to get the box which he had kept in the fruit room also placed in a cool room on the New York steamer, but found no choice between putting it in the meat room or leaving it outside. He preferred not to freeze the insects because the parasites, not being accustomed to such temperature, might succumb, and he therefore placed the box in an empty cabin below the water line. The voyage was fortunately cool, the temperature averaging about 60°. The shallow box was kept in his stateroom, as on the Cape steamer, and immediately upon arrival in New York both boxes were shipped to Dr. Howard. They arrived in New York in 25 days from Cape Town, a quick passage which, perhaps, could not be repeated.

On being asked if the black scale in South Africa is destructive to citrus trees to the same extent as in California, Mr. Lounsbury replied that he had seen citrus trees infested in only about ten places in the last five years, and never more than a few scales at any of these places. Occasionally he had seen the scale on citrus trees from Natal or from Australia which had been imported to the Cape. One orchardist having several thousand trees, said he had seen a few on his Australian trees, but they had disappeared. He himself was unable to find any there after a year from the importation. It is not known of what country the scale is a native, but it must have been in Cape Colony for many years. It occurs most commonly on oleander, which at the Cape is an outdoor plant, and Myroporum. He had found it 150 miles inland and on numerous indigenous plants away from settlements.

Transmission of Parasites.

A conversation on the subject of the transmission of parasites from one region of country to another then followed. Mr. Johnson said that he had recently received a request from Mr. Ehrhorn of California, for parasites that prey in the East on the imported cabbage worm. It seemed to Mr. Johnson that this was a matter for co-operation,

and he merely mentioned the fact as a suggestion from Mr. Ehrhorn that it is very desirable to establish such parasites in that section. He had promised to do what he could from his end of the line, and he hoped that others who were fortunate enough to possess such parasites would also assist. He had also received a request from Professor Morgan for specimens of the parasite which he had bred and which Mr. Howard had named. Professor Morgan is anxious to colonize this parasite on *Murgantia histrionica* in Louisiana, and Mr. Johnson had promised to send him parasitized eggs of the harlequin cabbage bug at the earliest opportunity, but up to the present time had been unable to find any specimens of this destructive pest. Three years ago it was one of the most destructive insects in the Maryland and Virginia cabbage-growing sections, but since the freeze of February, 1899, he had seen very few specimens. He was unable to say whether this was due entirely to the freeze or to the parasites. The parasite is a new species (*Encyrtus Johnsoni* Howard, Can. Ent. Vol. XXX, pp. 17, 18) and there seems to be some promise of its successful introduction into the South.

Mr. Gillettte said he considered the matter of parasites one of great interest, and he hoped the subject would be further discussed. In Colorado nature often seems out of balance. There are a number of species which are not abundant in the East, but which are very injurious in Colorado, and he thought it was because the parasites have not been carried to that section of the country. In his opinion it would be of the greatest benefit to certain portions of the country to introduce insect enemies, both parasitic and predaceous.

Dr. Howard said he desired to call the attention of the members of the Association to the fact that this was the most representative meeting of the Association ever held. Not only was Mr. Woodworth, of California, present, with Mr. Fernald, of Massachusetts, Mr. Weed, of New Hampshire, and Messrs Quaintance and Scott, of the Southern States, but also "our dear old friend," Mr. Fletcher, of Canada, and Mr. Lounsbury, who had carried American economic entomology clear across the Atlantic Ocean to South Africa. Mr. Currie, the under secretary of agriculture for Cape Colony, who was recently visiting Mr. Howard in Washington, had said that he was very glad indeed that he had sent for an American entomologist to come to the Cape, and congratulated his department upon being able to secure such a man as Mr. Lounsbury.

Dr. Howard presented a third note in which he gave an account of the useful work performed by the larvæ of a little lady-bird beetle, *Hyperaspis signata*, in destroying the scales on maple trees, *Pulvinaria acericola*, and also those of *P. innumerabilis*. These larvæ very much resemble the scales on which they feed.

Mr. E. P. Felt, State Entomologist of New York, read a paper on

Some Effects of Early Spring Application of Insecticides on Fruit-trees.

He said that a series of tests had this spring been begun near Albany, N. Y., with the object of ascertaining the best method of controlling the San Jose Scale in orchards. During the progress of the work trees were treated with mechanical mixtures of water and kerosene, and of water and crude petroleum, using 20 and 25 per cent. of the oils and applying with a kero-water sprayer. A few trees were treated with undiluted kerosene and others with undiluted crude petroleum; a number of trees were also treated with caustic potash whale oil soap, at the rate of $2\frac{1}{2}$ lbs. to a gallon of water, and some with a combination of the soap and crude petroleum in the proportion of one pound of soap to four gallons of water, and one gallon of the oil to ten gallons of the soap solution. The spraying was mostly done on April 11th and the work was performed in a mixed orchard of over 100 young pear, peach, plum and cherry trees, where the San José scale had been for about eight years, and the trees, therefore, presented every degree of infestation. The undiluted kerosene and crude petroleum were applied to the worst infested trees.

The spraying with the insecticides occurred just before the buds began to open, and with the exception of the trees treated with the undiluted oils very few or no harmful effects were observed. Eight days after spraying, the trees as a rule were budding out. Those treated with kerosene gave little indication of the presence of the oil on the bark, while the dark colour of those treated with crude petroleum was very apparent, a condition which still continues at the time of writing, June 20th. The whale-oil soaps showed to a considerable extent. Photographs were exhibited showing the harmlessness of

mechanical 20 per cent. emulsions of either kerosene or crude petroleum, also of similar 25 per cent. emulsions. Other photographs showed positive injury from the use of undiluted kerosene, and most marked injury from undiluted crude petroleum; one plum tree was killed outright by the latter treatment.

Experiments undertaken in other localities also served to show that crude petroleum may seriously injure trees under certain conditions. The trees may eventually outgrow the harm, and it is possible that the injury may be no greater than the scale would have caused, if allowed to go unchecked. The mechanical dilutions of crude petroleum, at least up to 25 per cent., appear to be harmless if applied before the buds are open, and it is to be hoped that they will prove effective in controlling the scale.

A general discussion followed the reading of Mr. Felt's paper. Mr. Scott said that in Georgia undiluted crude petroleum killed peach and plum trees outright, but 50 per cent. and less strength did very little damage. The best results were obtained with 25 per cent. in mechanical mixture with water sprayed with a Gould kero water sprayer. The application was made just before the fruit buds opened in the spring; all the insects reached by the spray were killed, according to notes made up to June 12. Until that date the sprayed trees remained oily and the odor of the crude petroleum could yet be detected. It is a reasonable conclusion, then, that the scale can not live so long under such a coating of oil. He had concluded that the 25 per cent. crude petroleum in mechanical mixture was better than refined kerosene of the same strength.

Mr. Woodsworth said that when the bulletin from the New Jersey station came out it was heralded all over California, and he had to write more letters in regard to the kerosene and crude petroleum treatment than about any other insecticide. Crude petroleum in California is a very indefinite term, since there is a crude petroleum from Ventura which is as thick and black as molasses, and from that it varies to crude petroleum which is almost as thin as gasoline. Even in a single well the product varies according to depth and age, and distillations show that it varies greatly in composition. He had been assured that the Eastern product varied also, and was of opinion that before we can recommend any percentage of crude petroleum we will have to establish a criterion of excellence. The different kinds of crude petroleum he had experimented with in California produced very different results—strikingly different. There is also a very decided difference in results according to time of spraying with the same oil. Thus spraying before rain and after rain may produce entirely different results. He had sprayed with some forms of crude petroleum without injury which would have thoroughly destroyed the foliage at another time of day. The amount of water in the leaf may determine to a certain extent the damage by the oil. It seemed to him, therefore, that another thing that must be done before we can really properly understand the action of the oil will be to study the effect of the oil upon the vegetable tissue. Perhaps this had already been done, but it was still in large part a mystery to him.

Mr. Webster said he had used oil from two wells located in different parts of Ohio this year, and although the analysis ran almost exactly the same in each case the effect has been different. In the one case he had not seen the orchard for several weeks, but when he last saw it the peach trees seemed to have been in many instances killed by the use of crude petroleum. He could not say whether the oil had been applied just before or just after a rain. In the other case the trees sprayed were seedling apples on the experiment farm, the experiment being made to determine if possible the effect upon the trees and not against insects. Some of the trees leaved out at the proper time about as freely as usual, while others had no leaves at all. At the present time, however, there was no apparent difference whatever in them, all having finally leaved out precisely the same. It was evidently nothing but a temporary injury. His experiments had produced such various results that he was badly mixed up and did not favour recommending the use of kerosene of any sort. He was of the opinion that the variation would be just as great in the crude article as in the refined.

Mr. Hopkins said that in West Virginia they have a great variety of petroleum, from that as thick and black as molasses to the thin light-coloured product. The oil obtained from the Standard Oil Company is a mixture of all kinds except the heavy oil. The heavy oil is used for lubricating machinery. He had obtained some results which are quite at variance with the testimony of others and show what conflicting results can be obtained in different States. In one case he recommended crude petroleum as an experi-

ment in a large orchard which was almost dead from the scale and which the owner refused to cut down. It had been sprayed once with pure kerosene, which did some damage and killed many scales, but the owner had allowed it to go without treatment and the scales had again covered the trees. He sprayed it with crude petroleum obtained in Baltimore. When he last saw the orchard, in April, the trees were black and greasy, but underneath the bark they were as healthy as ever, the leaves were coming out in full, and the owner claimed that the crude petroleum had benefited them. He was not recommending the oil, but simply giving this as an example. His spraying was done in February and wherever the oil touched the bark it remained dark and greasy for months afterwards. A thorough examination failed to reveal any of the living scales, and he believed that the young scales could not settle and live on the oily surface. He felt very much encouraged. It is one of those problems which require co-operative work. As a result of further investigation, he thinks it may become one of the best insecticides ever discovered. He could not think of any better work than trying to find the reasons for the great difference in results in experimental work with insecticides.

Mr. Webster said he was unable to see what could be gained even if crude petroleum should be perfected. It was true that we will have to get something cheaper and more effective than whale-oil soap, which if used on peach trees except during the winter will destroy the fruit, but in view of the difficulty he had had in getting crude petroleum and the high price asked for it, how much better an insecticide than whale oil soap would we have even if it was perfected? He thought that entomologists who cared for their reputation would experiment much and say little for publication, for the present at least. He further stated that while experimentation was always in order, it would be best to stick to the whale-oil soap until more obscurities in regard to the use of petroleum had been eliminated.

Mr. Johnston said he agreed with Mr. Webster. We have got to get something better than kerosene for both peach and plum. In one instance he had sprayed an orchard of two hundred 9-year old peach trees in February with 25 per cent. kerosene and not a tree was living on the 28th of April last. It seemed to him that atmospheric conditions were at the bottom of the difficulty, and he thought it would be necessary to go back to the old whale-oil soap remedy, which destroyed the scale more effectively and was less liable to injure the trees. It would not be wise to substitute crude petroleum for whale-oil soap. After three years experience with the soap, kerosene and gas, he was of the opinion that there are other conditions which must be studied more seriously in the future than in the past, and he heartily agreed in the opinion that co-operation is desirable. He believed it would produce better results in the future. We must not confine our labours to the territorial boundaries of a State, but go outside for information, suggestions and experiences of others.

Dr. Fletcher remarked that he was glad to hear what had been said about whale-oil soap and crude petroleum. He had never yet been able to see what object there was in trying to use petroleum. The results were far too conflicting and always unsatisfactory, and the question of cost in the ruin of apparatus was never considered. There was very slight injury to the hose in the use of potash whale-oil soaps, which could now be obtained of pretty uniform manufacture and had been giving good results. These are always to be had, and are easy to get in most places, while he had found great difficulty in getting crude petroleum. He thought there was room for experiment with much weaker mixtures of the potash soaps during the summer. His experience was in favour of these soaps in preference to either crude petroleum or kerosene mixed with water. Even with the kerosene emulsion there is sometimes unexpected injury to the trees, which was always put down to difference in the oil or in the water. He was satisfied for the present that the whale-oil soap was the safest remedy, and it was the best for those who are official entomologists, who have to recommend formulæ to people who will make a mistake if they possibly can.

Mr. Sanderson related his experience with crude petroleum, which was favourable to its use. He had sprayed a pear orchard on the Delaware river with it in the latter part of January, on a cloudy day, followed by a little hail and rain soon afterwards. Two months later he sprayed another lot of 100 trees with a 25 per cent mixture; it was a very windy day and almost all the trees previously sprayed got a dose of the 25 per cent.

mixture on one side. Examination shows no injury on either lot. Here and there could be seen a tree not doing well, but that was owing to the spray of a year before with pure kerosene. The buds were not injured. The growers in his region never use whale-oil soap, because it destroys the buds. They have used it during midwinter and it destroyed buds, and have now given it up.

Mr. Woodworth said that he did not wish his former remarks to be construed to mean that there is no future for crude petroleum as an insecticide, but he desired to emphasize the fact that there is a great deal to learn. In some of the large orchards in California crude petroleum has been used with success, but not against the San Jose scale. He is of the opinion that there is a great future for crude petroleum, and that the time will come when it will be cheaper in the East. In California it is the cheapest insecticide that can be bought.

Three papers were read by Mr. Clarence M. Weed on "The oviposition of an egg parasite of Vanessa antiopa"; "The oviposition of Cacœcia cerasivorana," and "The relation of Pimpla conquisitor to Clisiocampa Americana." The last-named insect (*Pimpla*) is the most important parasite which attacks the pupa of the apple tree tent-caterpillar.

Hydro cyanic-acid gas.

The reading of a paper by Prof. Fernald on "The Marguerite Fly," which he has retained for publication elsewhere, led to a discussion regarding the use of hydro-cyanic acid gas.

Replying to a question from Mr. Johnson, as to whether hydro-cyanic acid gas had been used, Prof. Fernald stated that there was objection to the use of this substance among florists, who have an exaggerated idea of the danger involved and will not often use it. He had no doubt hydro cyanic-acid gas would be more effective, but thought the florists would prefer to use carbon bisulphide, as this substance had proved satisfactory.

Dr. Fletcher thought that remedial work against the flies during the winter would be better than work against the larvæ after they have eaten the leaves.

Prof. Fernald replied that the problem had been thus far looked at by him entirely from the florists' standpoint, and the insect treated in the stage at which the florists would first see it and want to treat it. He was certain, however, that the fly could be handled by fumigating the greenhouses.

Mr. Johnson stated that one could not be too careful in the use of hydrocyanic-acid gas, and he wanted to caution all those who used it. In one instance, after preparing the chemicals necessary for generating the gas, he thought he would take his chances in dropping the cyanide in the jar and get out, but he felt the effects of the gas almost immediately. By the time he reached the door a haze came over his eyes, everything looked black, and a feeling similar to blind staggers overcame him. Experience has proved that it is not a trifling matter, and he would caution all who had occasion to use the gas. At the same time he felt that hydrocyanic-acid gas was the coming material for the destruction of certain insect pests in mills where stored grain and other products become infested. He had recently performed one of the largest experiments ever undertaken in the use of hydrocyanic acid gas, in a five-story brick mill in Canada. Over 150 pounds of potassium cyanide was discharged in the mill, and the results were very gratifying. It practically eliminated the flour moth from the mill.

Dr. Fletcher said he did not think enough care could be taken in giving instructions when recommending hydrocyanic-acid gas for general use, especially in this stage of introducing it, as a fatal case or two would put an end to its use entirely. Several striking instances had lately been mentioned which show the intensely poisonous nature of this gas. Much more care, instead of less, than has been exercised in the past is necessary. With regard to the use of bisulphide of carbon, he certainly was not satisfied with its use in mills and had not got the results promised for it. He was very sorry Mr. Marlatt was not present at the meeting, as his laisser-faire policy had given him a lot of trouble with the people he had to deal with, and he was of the opinion that some others of the Association might have liked to discuss that matter somewhat.

Mr. Webster stated that his fumigating houses in Ohio are covered carefully and made perfectly air tight by the use of layers of building paper, but if the ordinary nurseryman makes his own fumigating house he would not make it any more air-tight

than a hencoop. He had tried almost every way of introducing the cyanide, but the man who did the work invariably complained of severe headache, until he devised a method of combining the mixtures under the floors.

Mr. Lounsbury suggested that a simple way was to have a small lead tube leading from the outside of the house, the vessel containing the cyanide being placed under the tube, the door closed and locked, and the water and acid freshly mixed being poured in through the little funnel or tube and the aperture closed.

Mr. A. L. Quaintance of the Georgia Experimental Station, read the next paper on *Diabrotica 12-punctata* which is a serious pest to corn in the Southern States. The injury to the plant is confined almost entirely to the work of the larvæ on the underground portions of the plant, as the roots and stem below the surface of the soil. The attack is mainly in the spring while the plants are quite young. The writer gave an account of the life history of the beetle and the experiments that had been made with a view to its control. He found that if eight to ten grains of corn be planted in each hill, the plants would not all be destroyed, and the injury from this Southern corn-root worm would be practically avoided, or so distributed that the damage would be trifling.

Mr. C. P. Lounsbury gave a long and very interesting account of his observations on the habits and associations of a number of species of Ticks that cause great annoyance and much injury to live stock in South Africa.

Mr. W. M. Scott presented a paper on the Coccidæ of Georgia in which he enumerated 41 species of scale insects that he had found in the State, and gave their localities and food-plants.

On Saturday morning, June 23rd, the Association met in joint session with the Society for the Promotion of Agricultural Science, the President of which (Prof. Beal) read his annual address. Dr. L. O. Howard gave an account of the progress of Economic Entomology in the United States, which is published in the year-book of the U.S. Department of Agriculture for 1899; and Mr. C. P. Gillette read a paper entitled "Apiary Notes."

NOTES UPON THE DESTRUCTIVE GREEN PEA LOUSE FOR 1900.

(*Nectarophora Destructor*, JOHNS).

By W. G Johnson, College Park, Md.

Perhaps no insect in recent years has attracted more attention than the destructive green pea louse. It became conspicuous, first, on account of its ravenous attacks upon the pea fields, a crop heretofore practically immune from the ravages of insects; and, secondly, from the fact that it was a species not recorded in science. What condition in nature was responsible for such a general distribution of a new species of insect the writer will not attempt to discuss in this short paper. It appeared last year, and was recorded for the first time, from Maine along the Atlantic coast southward to North Carolina, and westward to Wooster, Ohio. It was also observed in Nova Scotia and Ottawa, Canada. I had it sent to me from Massachusetts and Vermont in July and August, and complaints of its serious nature have come to me from Chillicothe, Ohio, Long Island, N.Y., portions of New Jersey, and Wisconsin (August). I first observed the pest May 18, 1899, and have had it under constant observation from that date to the present writing. I described the newcomer in the February issue of the Canadian Entomologist as *Nectarophora destructor*. A very long name, I admit, but if there is anything in a name being a burden to its possessor, we hope that this one will accomplish such a purpose.

From the first I have held that this insect is probably a clover pest. It has been observed upon both red and crimson clover, and this season hundreds of acres of red clover have been destroyed by it. In one instance, reported to me June 13, Mr. C. Silas Thomas, of Lander, Frederick County, Md., stated that the pest had almost entirely ruined 65 acres of red clover for him. Many other cases of a similar nature were reported or observed by us. The attack has been very common upon crimson clover also, but I have not heard of a field being killed by it. That clover, and perhaps the red clover, is

its original food plant seems quite conclusive from our experiments and observations. I am of the opinion that red clover is its original food, and that it is, therefore, primarily a clover pest. Without doubt it is a native American insect, and has spread its attacks to crimson clover and field peas, as these two plants have encroached upon the feeding ground of the louse. It spends the winter, at least in the South, as an adult in clover fields. It may winter in another form farther north.

It is barely possible that this insect has other food plants and lives over winter upon them, but clover is, no doubt, the main plant upon which it lives. Mr. F. H. Chittenden, of the U.S. Department of Agriculture, Division of Entomology, in Washington, observed this insect, or one very closely allied to it, feeding upon a number of species of vetches in Washington this year.

From a long series of experiments in the laboratory we have shown that there are two kinds of females known at present, the winged and wingless forms. No male has as yet been discovered, and perhaps in the South none exists, and the insect remains over winter in the adult stage, as stated above, upon some plant, and in most instances this is clover. The female produces living young which reach maturity in from ten to fifteen days, and possibly less time in hot weather. As an example, a young one born March 4 reached maturity (winged form) March 16, or 12 days from time of birth, and was producing living young on March 19. From that date to April 17 it became the mother of 111 young and then died. Her first young (wingless form), born March 19, reached maturity and was producing on March 31, or eleven days from time of birth; from that date to April 13 she gave birth to 120 young and died. We have made many other observations of a similar character, but this will suffice to show the rapid reproductive powers of this insect, and we might state that in many instances where this insect was first observed on May 1, three weeks later the fields were abandoned on account of its attacks. Calculated from the average number of insects produced per day (which is 6), in six weeks one would become the progenitor of 423, 912.

It was estimated last year that the total loss from the attacks of the creature along the Atlantic Coast States was $3,000,000, and that the crop was only one-half the usual output. From information obtained from the largest growers, the most experienced seeds men, and most extensive dealers in this line of business, "The Trade," a canned goods journal published in Baltimore, has gathered the information that the crop of peas of the Atlantic Coast this year will not exceed, on the outside, one-third of what it was last year. This is about as serious as it can be, when it is taken into account that it is mostly due to this one pest, and that it is certain to increase its destructive powers from year to year, unless some factor in nature intervenes to check and retard its further development. With this condition of affairs it is not strange that farmers have become thoroughly discouraged and make the statement that they will be more cautious about planting peas for market purposes, or for the packer, in the future.

With this year's experience, however, we have shown conclusively in our experiments and practical works in the field that this insect can be kept in control to a very great extent if taken in hand in time. In the first place, the peas must be planted in rows 24 or 30 inches apart, and not broadcast or in drills, as has been the case over a wide area throughout many of the Southern States. As an illustration of this we may cite an instance on the place of Mr. C. H. Pearson, a large packer of Baltimore. His 600 acre pea plantation was practically saved by persistent and energetic efforts on his part this season. All the methods from a practical standpoint were tried on this place, and it was found that the brush and cultivator method was the most effective. Forty men were therefore engaged to work in the field, and the 600 acres were brushed and cultivated every third day for a period of two weeks, and in this manner the entire field was saved, netting the owner from 25,000 to 30,000 cases of peas of 2 dozen each. It is a fact which is not questioned by those who are familiar with this plantation that had not this persistent and energetic fight been followed, the greater portion of the peas would have been destroyed by the insect. Last year the peas over the same area were broadcast so there was no opportunity of fighting the pest, and as a consequence 480 acres were entirely ruined by it. This year, by changing the method, and by a new system of fighting the pest, the peas have been saved. Many other illustrations of a similar nature could be given where we have been following this method persistently in this State.

The brush and cultivator method is a simple one; a good pine switch is used to

brush the vines backward and forward ahead of the Iron Age cultivator, drawn by one horse, and in this manner the insects are covered and a very large proportion of them destroyed. The cultivation should not be repeated until the third day, as it requires usually something over forty-eight hours for the destruction of the adult insects when covered with earth. On this plantation we also sprayed a large acreage to show the practical side of this work. Suffice it is to say that we have found that no spray can be used which can destroy a percentage of insects large enough to warrant the expense of the operation. In this instance we sprayed 100 acres in two days, and thoroughly tested the method from every standpoint, using various materials. We abandoned the spraying apparatus, and began the brush and cultivator method, which was followed up persistently, with the results already noted. We have also used the "brush and pan," in which a bushel of lice were caught to each row of 125 rods long.

Many natural enemies, such as parasitic and predaceous insects, have been found feeding upon this pest in the fields, and in this manner, no doubt, the number has been somewhat reduced The most important factor, however, we have observed in the destruction of this pest has been the fungous disease, *Empusa aphidis*, which was common during the early part of the season upon this insect, in both clover and pea fields. It is a contagious disease and destroys the pest in very large numbers, under certain conditions. In one instance we found 58 dead lice upon the undersurface of a single lobe of a clover leaf, and it was not an uncommon thing in June to find 15 or 20 dead lice upon the under surface of a pea leaf. With the rains which prevailed throughout this section of country during June, which fostered the developement of the disease, it spread rapidly throughout the infested fields, and as a consequence it was very difficult to find the pea-louse upon late peas. A careful examination of peas where the insects were abundant in June showed that they were practically free from them. We feel, therefore, that the climax, as far as the development of the insect this season, has been reached, and that these silent factors in nature are now actually reducing the pest to such a point that it may possibly be several years before it will be such a destructive pest in this section as it has been for the past two seasons. At any rate, the conditions are such that the farmer and canner have new hope, and we trust the future will bring fewer lice and more peas.

In discussing the paper, Prof. Hopkins enquired whether the insect were possibly an introduced species, and if there were any records of its previous occurrence in large numbers.

Mr. Johnson replied that, in his opinion, it was not an introduced pest, but an indigenous insect, which had multiplied enormously from the change of conditions. The only record he had regarding it was one made ten or twelve years ago by Mr. Beckwith at the Delaware station, and another of its occurrence along the Potomac River in 1887. In neither case, however, was it certain that it was the same insect, as no specimens had been preserved. The pea-growers state that the insect has been known to them for many years.

Prof Hopkins said that this case is such a complete parallel to the invasion of the pine-bark beetle, the trouble from which is now over, that it occurred to him that in this case, within the next few years, this insect will probably disappear or become exceedingly rare. He had taken the trouble, in connection with the investigation of the pine insect, to look up the history of invasions by indigenous insects, and found that they multiply rapidly for several years, become enormously destructive, and a few years later disappear. They are destroyed by parasites or by climatic conditions and soon become rare species. This happened in the case of the pine insect, which was scarcely heard of before, and was one of the rarest insects in collections until it suddenly occurred in 1891 in such enormous numbers as to destroy millions of dollars worth of timber, but now it is practically extinct. Not a single living specimen has been found since the fall of 1892. Prof. Johnson's paper shows the great importance of the work he has undertaken, and his experience will be of inestimable value in dealing with future outbreaks of the pea louse. He thought the farmers of Maryland would make a great mistake by changing their locations for growing peas until perhaps a year had elapsed, because if the rule follows in regard to sudden invasions by indigenous insects they will soon disappear or become rare.

Mr. Johnson said he was greatly obliged to Mr. Hopkins for his opinion, but there is so much money at stake that the growers could not let the matter rest awaiting nature's

relief. He believed fungous diseases, especially *Empusa aphidis*, are one of the factors which will bring about the temporary disappearance of the pest.

Mr. Galloway said the point in regard to the appearance and disappearance of forms holds good in fungous attacks also, the most striking example being the potato blight. The same holds good in the passing of the Russian thistle. These things come and go and come again, and the principle holds good with fungous diseases as well as with insects

Papers were read by Mr. B. T. Galloway on "Progress in the Treatment of Plant Diseases in the United States," and by Prof. Webster on "Meteorological Influences on the Hessian Fly." These were retained for publication elsewhere. The meeting then adjourned to the Central Park to inspect Mr. Southwick's spraying outfit.

On reassembling in the afternoon an elaborate and valuable paper was presented by Messrs. E. D. Sanderson and C. L. Penny, of the Delaware Experiment Station, on "Hydrocyanic Acid Gas as an Insecticide on Low Growing Plants." The results of their experiments proved that this method of treatment is practicable, but, owing to its cost, only for plants of some considerable value and for relatively small areas. Under many circumstances it could be used to much better advantage than any other means of combating a pest, and often might be found effectual where no other method of extermination were possible.

Mr. Sanderson then presented a paper, "Notes from Delaware," in which he reported upon the most noticeable attacks of the year in that State, and dwelt particularly upon the destructive green-pea louse, which had already been under discussion. After giving an account of the various parasites which preyed upon the insect, he said:

"The enemies of the lice appear too late to prevent the bulk of the injury, and as the same was true last year, it seems impossible to place any dependence upon them. It seems evident, however, that the lice are attacked by a parasite while still in crimson clover (parasitized lice were also common on red clover), but are not parasitized until they have been on peas for some time. Is it not possible the sudden appearance of the lice last year may have been due to the severe winter, which killed off the parasites and other enemies which usually hold the lice in check on the clover and so reduce their numbers that but few of them spread to peas?"

"The very sudden appearance of this new species last year was a unique entomological surprise. Where it came from was a question It would seem to me that the original food plant of the pest was clover and probably crimson clover. It is true that crimson clover is not grown in the North where the louse was found destructive last year, but it is entirely possible that it may have spread from sections in which crimson clover is grown to red clover in these localities, but have been held in check by its parasites, and remained unnoticed. Furthermore, the insect enemies of red clover have at various times received study without this species having been previously noted. On the other hand, there seems to be good evidence that the louse has been on crimson clover for several years. One of our best farmers, Mr. Frank Bancroft, of Camden, Del., tells me that he has seen what he judges to be the same louse on crimson clover for at least six or seven years. In 1890 crimson clover grown upon an experimental plot at the Delaware Station became so badly infested with a plant louse that it was feared it would be killed. Professor Beckwith's notes state (May 11, 1890) that these were exterminated by a fungous disease, and the clover was not seriously injured. Upon looking over the station collection I found specimens of *N. destructor* which unfortunately were without any label, but were among material which was unquestionably collected prior to 1896. Upon corresponding with Professor Beckwith he informed me that he distinctly remembered preserving specimens of the aphis in question As his accession catalogue shows no such specimens to have been numbered, though by no means conclusive, the evidence is at least strongly circumstantial that *Nectarophora destructor* occurred in injurious numbers on crimson clover as early as 1890."

"As regards remedies, I have practically nothing new to offer. It evidently is important to plant crimson clover as far from peas as possible, and to turn it under as early as practicable."

APHELINUS FUSCIPENNIS AN IMPORTANT PARASITE UPON THE SAN JOSE SCALE IN EASTERN UNITED STATES.

By W. G. Johnson, College Park, Md.

For the past eight years the writer has been paying particular atttention to the parasites attacking scale insects. During this period many species have been bred, but not many specimens from any particular scale. The instance cited below is, perhaps, the most important from the economic standpoint yet discovered in these observations.

Since we assumed charge of the State work in Maryland we have collected the San Jose scale on various food plants, and inclosed infested twigs, about 4 inches in length, in glass cylinder tubes open at both ends. The ends were closed with cotton, and if any parasites existed upon the scales they were easily detected and mounted for study. Only upon rare occasions have we taken more than a half dozen specimens from a single tube. This experience has been repeated year after year until the fall of 1899.

Of the four species of true parasites known to feed upon the San Jose scale, three of them have been bred in Maryland. So far as I know *Anaphes gracilis* How., bred by Dr. L. O. Howard from scales from Charles County, Md., has not been reared from this scale from any other State. *Aspidiophagus citrinus* Craw. has been reared only in California from this pest. *Aphelinus mytilaspidis* Le B. and *Aphelinus fuscipennis* How. have been reared from scales taken at the following places in this State: Riverside, Annapolis Junction, Araby, and Mitchellville. Last fall, however, I discovered a new locality for *A. fuscipennis* near Easton, Talbot County, in an infected orchard along the Miles River. The orchard contained a miscellaneous variety of fruits, and all the trees were quite seriously infested with the San Jose scale. Instructions had been given the owner to cut them down as soon as possible and burn them. A quantity of small branches incrusted with scale were brought to the laboratory and inclosed in breeding tubes. Much to my surprise these tubes were swarming with parasites a few days later From one tube 1,114 specimens of *Aphelinus fuscipennis* were taken; while a second tube gave 432, a third 1,478, and a fourth more than 1,000, but owing to an accident the count in the case last mentioned was not exact. The writer was greatly elated over the discovery, and immediately sent out the following statement to the State press:

I am advising my correspondents not to burn twigs and branches cut from trees infected with the San Jose scale. If the tree is so seriously infested it can not be saved, it should be dug up by the roots, trimmed, and the brush and wood piled in the orchard, where they should be left until about the 1st of June or longer. If the trees are to be sprayed with either a 25 per cent solution of kerosene and water, whale-oil soap (2 pounds in a gallon of water), or crude petroleum, the pruning should be done first and the cut branches gathered up and piled where the spray cannot reach them.

This is done to preserve the little friends nature has supplied to help keep the scale in check. If the twigs and branches are burned or sprayed the parasites would be destroyed, as they feed upon the scale insects and are now wintering under the shell-like cover protecting them. These parasites are very small, being scarcely visible to the naked eye, yet they play an important part in the economy of nature. They are wasp-like in general appearance and quite active. It would be very difficult to estimate the actual number of parasites present upon a 5 or 6 year old peach or plum tree, but it is safe to say that they would run into the millions if the parasitism was at same rate as upon the twigs in the tubes.

If I had burned these twigs I should have destroyed all the parasites. On the other hand, if I had left them on the ground in the orchard the little friends would have escaped and concentrated their attacks upon other trees where the scale had been missed by the sprays. It is clear, then, that by using a little judgment in these matters we can assist nature in restoring the balance she desires. Do not sit down and fold your arms thinking nature is going to restore this equilibrium at once; you must do your part faithfully and well. Prune your orchard as soon as possible and save every twig that contains a scale; then spray with a 25 per cent. solution of kerosene and water, using any first-class spray pump, or with whale-oil soap (2 pounds to a gallon of water), before the buds open.

There is no possibility of the scale spreading until some time after the 1st of June. The young begin to appear in the vicinity of Washington, D.C, June 10 to 15 [in 1900 young were seen by the writer crawling June 3 near Washington], and the insect continues to breed until very cold weather. We have seen young, just born, on trees as late as December 19. When a twig is cut off between, say, December 20 and May 15, there is no possible danger of the scale spreading from it. It is not possible to transfer one of these insects from one twig to another after it is "set" and formed a scale over its back, and all of them die as soon as the sap is dried out of a cut twig or branch. Badly infested trees of no commercial value should be cut down as soon as possible, before the buds open, and the brush piled. Do not leave the stump standing, as it may prove a veritable breeding place during the summer. If you are so unfortunate as to have this scale, remember that eternal vigilance must be the order of the day, and you will find before you are through with it that it is no trifling matter.

The orchard in question was not destroyed by burning, as first suggested, but the trees were pruned and the cuttings saved. In May, 1900, the writer had a large quantity of the branches from this orchard carefully packed and sent to Mr. W. W. Obbey, Grayson, Charles County; to Capt. R. S. Emory, Chestertown, Kent County, and to Hon. Charles G. Biggs, Sharpsburg, Washington County. Instructions were sent to place the infested branches in grape baskets and hang them about the orchard where the scale was most abundant In this manner we will establish *Aphelinus fuscipennis* in the various counties and under different conditions. We have every reason to believe that the experiment will prove successful.

In this case the study of parasitism has given us a valuable suggestion for the treatment of scale infested orchards, namely, never burn a twig or tree cut late in the fall, winter, or early spring. A positive remedy one day may be wrong the next day, just as we are able to unravel nature's secrets and interpret them for own good.

Since the above was read the writer has tested a lot of twigs from the Charles County orchard and has bred numerous specimens of *A. fuscipennis*, thus proving that a parasite is thoroughly established there.

Mr. A. H. Kirkland read a paper on "the Brown-tail Moth in Massachusetts," in which he gave an account of the natural spread of this injurious insect throughout the State. The infested area in 1896 was only 29 square miles; in 1899 this had increased to 928 square miles.

The next paper was by Mr. C. P. Gillette, who gave a series of interesting notes on some of the most important insects of Colorado. Mr. Johnson followed with "Notes on insects of economic importance in Maryland during 1900," and Prof. Webster with an account of the "Insects of the year in Ohio." Foremost among these he placed the Hessian fly, regarding which he said: "In point of destruction the Hessian fly outranks every other insect, when considered in connection with the wheat crop of 1900. It is doubtful if there will be over 20 per cent of an average crop in Ohio; the remaining 80 per cent may be largely charged up to the ravages of this pest. As an average crop in Ohio amounts to, approximately, 40,000,000 bushels, the loss may be computed at 32,000,000 bushels, which at the ruling market price would mean a loss of $22,400,000, at least three-fourths of which, or $16,800,000 can be justly charged up to the ravages of the Hessian fly. More extended studies of this outbreak and some of the meteorological phenomena connected therewith are given in another paper. The unprecedented abundance of the pest this year may be attributed largely to the almost total lack of parasites, the retardation of the fall brood over the northern half of the State, and the extremely favorable weather during the autumn of 1899, which enabled all but the very latest deposited eggs to hatch and the larvæ develop to the "flaxseeds" and thereby defy the adverse influences of winter. In many localities the later sown wheat escaped fall attack and up to May 1, 1900, was uninjured, but the flies developing in the earlier sown fields seemed to have migrated *en masse* and settled down on those sown later, and the result is that in many cases the destruction is as complete in the one as in the other."

Mr. Woodworth gave a short account of the Entomological situation in the State of California, referring especially to Scale insects, the Codling moth, peach and grape insects. The last paper read was by Dr. Fletcher of Ottawa, who gave an account of the most noticeable insect attacks of the year in Canada, mentioning those affecting fruit trees, roots and vegetables, cereals, fodder-plants, and trees and shrubs.

Before the meeting closed, an interesting discussion took place on the matter of common names for insects, in which a number of the members took part. A committee was appointed to deal with the common names of such injurious insects as may be discovered in the future and to remove ungainly and inappropriate names.

The following officers were appointed for the ensuing year: President—C. P. Gillette, Fort Collins, Col.; First Vice-President—A. D. Hopkins, Morgantown, West Va; Second Vice-President—E. P. Felt, Albany, N. Y.; Secretary-Treasurer—A. L. Quaintance, Experiment, Ga.

The next meeting will be held at Denver, Col. on the 22nd and 23rd of August, 1901.

REGULATIONS RE SAN JOSE SCALE

Extract from The Canada Gazette of Saturday, January 12, 1901.

ORDER IN COUNCIL.

His Excellency, in virtue of the provisions of section 5, chapter 23, 61 Victoria, intituled "An Act to protect Canada from the Insect Pest known as the San Jose Scale," and of 63-64 Victoria, chap. 31, "An Act to amend the San Jose Scale Act," and by and with the advice of the Queen's Privy Council for Canada, is pleased to order that exemption from the operations of the above mentioned Act shall be and is hereby authorized of any trees, shrubs, plants, vines, grafts, cuttings or buds, commonly called Nursery Stock from any country or state to which "The San Jose Scale Act" applies; and that all importations thereof shall be and are hereby permitted to be entered at the Customs Ports only of St John, N B., St. John's, Que., Niagara Falls and Windsor, Ont, and Winnipeg, Manitoba, between the following dates in each year: 15th March to 15th May in the spring, and 7th October to 7th December, in the autumn; and at Vancouver, British Columbia, during the winter months only from 15th October to 15th March, at which ports they will be thoroughly fumigated with hydrocyanic acid gas by a competent Government official in accordance with the most approved methods.

All shipments made in accordance with the above will be entirely at the risk of the shippers or consignees, the Government assuming no risk whatever.

Packages must be addressed so as to enter Canada at one of the above named ports of entry, and the route by which they will be shipped must be clearly stated upon each package.

As it is well known that well matured and thoroughly dormant nursery stock may be safely treated, but that there is danger of serious injury to the trees if fumigated in the autumn before the buds are thoroughly dormant, or in the spring after the buds have begun to unfold, all stock which when received is immature or too far advanced for safe treatment will be refused entry and held at the risk of the shipper.

His Excellency, in virtue of the provisions of section 7 of the Act first above mentioned, is pleased to direct that the authority herein granted be published in the *Canada Gazette*.

JOHN J. McGEE,
Clerk of the Privy Council.

OTTAWA.

OBITUARY

Mr. JOSEPH EVELEIGH TREFFRY died at Quebec, of spinal meningitis on the 27th day of April last—his second wife had died but a few months before. Mr. Treffry belonged to a Cornish family. He came to Canada about thirty years ago, and at first lived in Montreal. After a while he moved to Quebec, and for ten years was reporter and proof-reader on the staff of the *Morning Chronicle*. He left newspaper employment to accept the Government position of English translator in which he continued till his death. He had been a member of the Quebec Branch of the Entomological Society of Ontario from its formation; and his ready pen and ability as a journalist had often been exercised in its favour. Before his bereavement his wit and good humour had added greatly to the interest of the meetings of the branch. He was buried in Mount Hermon Cemetery.

T. W. F.

THE NORTH-WEST (CANADA) ENTOMOLOGICAL SOCIETY.

The second Annual Meeting of the North-West (Canada) Entomological Society was held at Lacombe, Alberta, on 16th January, 1901. It was a meeting essentially in the interests of farmers. At the request of the President, the chair was taken by Mr. F. H. Wolley-Dod, of Calgary, who was supported by the vice-President, Rev. M. White, and several well-known farmers of the district. A number of letters in support of the objects of the Society were read, including letters from Mr. C. W. Peterson, Deputy Commissioner of Agriculture, N.W.T.; Prof. C. C. James, Deputy Minister of Agriculture, Ontario; Dr. James Fletcher, Dominion Entomologist, and the Right Reverend the Bishop of Calgary and Saskatchewan.

The President of the Society, Percy B. Gregson, on being called upon (after the opening remarks by the Chairman) explained that the object of the Society was to instruct and interest the farmers of the North-West regarding the insects that affect them,—to bring home to them individually the principles which underlie the treatment of insect and weed pests, so that they can deal with them in time, without waiting, as so many do, till their crops are destroyed before applying for advice. Mr. Gregson stated that farmers were beginning to appreciate the value of the study of insects, and this was evidenced by the fact that a number of Agricultural Societies had during 1900 become active supporting members of the North-West Entomological Society. Mr. Gregson impressed on farmers the importance of careful observance of the habits of the insects that came under their notice, such as their time of appearance, their method of feeding, the nature of their food, etc. Some insects, such as beetles and caterpillars, feed by nibbling their food, and poison should therefore be placed on their food, so that the insects when consuming the leaf will also consume the poison with it. Other insects such as lice, pierce through the outside of the leaf with their trunk-like beaks, and poison, therefore will not reach them. As however, insects breathe through little openings in their sides they can be suffocated by anything which clogs up their breathing valves, such as coal oil emulsion, or the fumes of tobacco.

The list of injurious insects in the North-West is already a long one, and as insects always follow cultivation, we must, as the country gets cultivated, expect arrivals of fresh insects. There are very many ways by which insects are always liable to be imported into a new country. They may come in clothes, lumber, domestic animals, packing substances (such as hay, straw or grass). It was probably in packing substances that all the grass stem maggots, common to Europe and America, have reached us, including the Hessian fly, the wheat stem midge, and wheat stem saw-fly.

In applying remedies there is a reason for each different remedy recommended, and in the list of insects presently given the reason for each remedy can readily be seen.

The Principal Injurious Insects of the North west for 1900.

The Red Turnip-beetle (*Entomoscelis adonidis*). In many places from south of Calgary to north of Edmonton, and in Saskatchewan and several districts in Assiniboia this beetle has been more or less abundant—in some instances devastating entire fields. Around Beulah, in Manitoba, it has also been somewhat abundant, but chiefly confined to mustards. Remedy: Spray the plants with Paris Green solution (1 lb. to 160 gallons of water) and stir in also 1 lb. of quick-lime, or if in small quantity, ½ oz. of Paris Green, ½ oz. of quicklime, and a pail full of water. In mixing Paris Green Dr. Fletcher recommends that it should first be made into a paste with a small quantity of warm water, and the paste afterwards mixed with the larger amount of water required. If it does not adhere readily to the leaf, a little soap added to the water will overcome the difficulty.

The Turnip flea Beetle (*Phyllotreta vittata*) has been very general throughout the North-west Territories, but the damage done was not great, owing to a counter-attraction in the shape of mustards. Remedy: Dust the young turnips with dry Paris Green and land plaster, or dry Paris Green and sifted ashes when the dew is on the young turnips. This little beetle hatches in May—about the third week—and by deferring sowing the turnips until June the beetle will have hatched and disappeared to native cruciferous plants before the young turnips are up.

The Diamond Back Moth (*Plutella cruciferarum*) in June and early July was extremely abundant throughout the Territories and in many parts of Manitoba, practically the whole of the cultivated area of Alberta, Assiniboia and Saskatchewan was visited by this pest, and many fields of cabbages, cauliflowers and turnips were completely destroyed. The larvæ of this moth also attacked lettuces, radishes, rape, etc. A field of turnips badly infested with this pest presents a weird and ghastly appearance. The riddled leaves are bleached and white like skeletons. Parasites have destroyed immense numbers of the larvæ Remedy, as to turnips, young cabbages, etc., except lettuces: Paris Green solution as recommended for the Red Turnip-beetle. The chief difficulty is in getting at the underside of the leaf, as the larvæ principally attack from underneath, In the case of lettuces, hellebore should be used. Scatter on the leaves—as much underneath as possible—when the dew is on, a mixture of 1 lb. of hellebore to 2 lbs. of sifted ashes.

The Colorado Beetle (or Potato-bug) has again made its appearance in Central Alberta, though not in large numbers. On 28th June both larvæ and mature insects were seen in several potato fields, but no great damage done. As this is the second year of appearance of this insect in Alberta it is possible these are an advance guard, and it is well to look out for them. Remedy, the same as for the Red Turnip-beetle. Do not kill the lady-birds. This bright scarlet little beetle and its larvæ greedily devour the young larvæ of the Colorado beetle.

The Three-lined potato-beetle has been more troublesome than the Colorado beetle. In some localities in the south of Central Alberta it has seriously damaged potato crops, but its presence elsewhere has not been reported. This beetle was the chief insect pest of potatoes in Ontario until the arrival of the Colorado beetle, which it seems to have heralded. Remedy, the same as for the Red Turnip-beetle.

The Rocky Mountain Locust has been very bad in parts of Manitoba, north of Douglas, and around Aweme. This pest is dealt with in the May, June and July numbers of the leading agricultural journals, issued from Winnipeg, so fully and clearly that its characteristics and remedies need not be repeated at length. In the Nor'-West Farmer, for instance, of 21st May, 1900, is a very good account of them. The insect lays its eggs in the soil among the stubble in the early fall (August and September) and they hatch in the following spring. If, therefore, the soil be deeply fall plowed the eggs will be buried so deep that the young when they hatch cannot get to the surface.

Cutworms,—(in Alberta and Assiniboia principally the garden ones such as *Agrotis clandestina*, *Plusia brassicæ*, and *Carneades ochrogaster*) have caused the usual amount of loss and replanting in several districts among cabbage and cauliflower growers. It is difficult to understand why there need be any loss from this pest when the remedy is so easy. Remedy: Take say 50 lbs. of bran and very slightly moisten it with water, and sweeten with a little sugar. Then mix well with it enough Paris Green to just color the bran (e.g. about a lb. of Paris green). The cutworms will eat this bran in preference to the cabbages. The common cutworm is not a climber, so wrapping a piece of smooth paper about 3 inches in breadth around the stem of the young cabbage when planting out is a good preventive remedy. The paper should be ½ an inch below the surface of the soil and 2½ inches above. Keep the garden clear of weeds and rubbish, old cabbages or cabbage stalks in the fall, so that the cutworm moth will have no attraction for laying its eggs. A more serious trouble, however, has been caused by another kind of cutworm in Manitoba. This is the glassy cutworm (*Hadena devastatrix*), and it, in the spring, committed very serious injury to wheat crops north of Stonewall. This pest was present in some fields in thousands, and marched in a phalanx devouring as they travelled. The remedy for the glassy cutworm is not easy. The grub burrows into the earth in the daytime, and comes to the surface to feed at night. It eats the whole plant, beginning just below the surface. Thoroughly spraying the grain along the front of their attack for a space of ten feet with a solution of Paris Green has been found successful. If however the crop has been ruined, turn chickens or turkeys into the field for a day or two, and then sowing oats for green feed might be tried.

Wireworms. These are the larvæ of the "click beetles." This is a pest very difficult to get at. There are several species of wireworm. They pass the winter in cells in the soil, so that for some species a plowing in August, and for others a plowing late in

the fall, will disturb these cells and kill the inmates by exposure. Seeding down only encourages the wireworm, but barley and rye seem distasteful to this pest, and fair crops of these can be grown even if the field be badly infested with it; and possibly the field itself be ultimately cleared of the pest.

Among pests of foliage has been the pallid aspen beetle. The loathsome larvæ of this beetle were very destructive to the early leaves of aspen poplars throughout Alberta and the Territories, and considerably marred their beauty. Remedy: Poison their food by spraying with Paris Green solution.

The striped cottonwood beetle was also very abundant on willows. The fetid larvæ emit, when disturbed, a milk like fluid from tubercles along their back, and trail a sticky fluid wherever they crawl upon the leaf. This is a very troublesome pest in the East, in districts where osiers are cultivated. The larvæ as well as the beetle cause the osier canes to branch by injuring the tips. Should osiers be cultivated in the Northwest this pest will be on hand. Remedy: Paris green or green arsenite solution sprayed on the food.

Lice on poplars and plants have been common in many parts of Alberta. *Remedy:* Suffocation by coal oil emulsion, or fumes of tobacco. The Western Blister Beetle was reported like "swarms of bees" on beans at Lethbridge in Southern Alberta about 25th June. Other blister beetles were abundant on vetches in Central and Northern Alberta.

Fleas. Towards the end of summer this pest became an intolerable nuisance throughout the Northwest. Hay mattresses swarmed with them. A slight odor of carbolic acid will prevent them from coming into a room so scented; but if introduced with hay or otherwise, then burning pyrethrum powder is a good remedy for driving them out.

Warbles in cattle appear to be on the increase. Cattle farmers are very well acquainted with this fly, but it is a trouble that is too apt to be treated as of not a very serious nature, and as not preventable. This, however, is a great mistake. In the first place the bot maggot, or warble, so damages the hides that grubby hides sell for one-third less than sound ones. But the beef itself is rendered so inferior that buyers of the highest class of meat, who supply hotels, &c., will not on any account buy carcasses showing traces of warble attack. Such beef has therefore to be sold at a lessened price below that obtainable for good beef, the reduction sometimes amounting to $5 per carcass. In view of the large and increasing exports of beef (cold stored) to England, it becomes important to see that the reputation of the Northwest is sustained by keeping stock free from this pest. In dairies, too, the loss sustained through the attacks of warbles is just as serious. There is the loss in quantity of flow of milk as well as deterioration in quality, resulting from the annoyance of the animals by the flies when depositing their eggs, and later by the grubs. The shrinkage in the milk is estimated at 10 per cent. and the deterioration in quality at the same rate, making a total of 20 per cent. By the time the warbles are discovered in the spring the mischief is done. Certain localities are more particularly infested than others, and a dry season seems more encouraging to the warble fly than a wet season, and where there is danger of the warble the animals should be protected during the summer months by spraying them occasionally with strong smelling oils, such as fish oil, train oil, kerosene emulsion, &c.

To make kerosene or coal oil emulsion add to 1 gal. of kerosene hot soap suds made of $\frac{1}{2}$ gal. of water (rain water preferred) and $\frac{1}{4}$ lb. soap. Then churn all thoroughly together till it will adhere to the surface of glass without oiliness. When required for use, dilute the emulsion by adding from 9 to 15 times its measure of warm water.

After the close of the discussion consequent on the President's address, the officers of the Society for the year 1901 were elected. The officers for 1900 were re-elected in the capacities respectively held by them with the exception of A. D. Gregson, who retired from the curatorship, the same being accepted by Percy B. Gregson, the collections having been safely removed to his house.

Mr. F. H. Wolley-Dod most generously presented to the Society a large number of Lepidoptera, the bulk of which were new to the collection.

Mr. O. C. Poling, of Quincy, also presented to the Society several exceedingly rare specimens including Neophasia Terlootii and Erebia Magdalena. Some of these specimens are represented in but one or two other collections in the world.

After a vote of thanks to the Chairman, the proceedings terminated.

Report of the Council.

On behalf of the Council of the North West (Canada) Entomological Society, the President begs respectfully to submit the following report:

Several fresh works have been added to the library of the Society during 1900, among them being a complete set of "Insect Life," (partly the gift of Dr. L. O. Howard and partly by purchase). The impossibility in this distant country of access to an outside Library of any kind has been and is an obstacle which the Society hopes gradually to surmount by accumulating serviceable works of its own.

It is encouraging to note that the farmers are taking a marked and growing interest in economic entomology,—the President having during the past year given by request addresses or papers on twelve occasions and at various places in Alberta and Saskatchewan. Various agricultural societies have become active supporting members of the North-West Entomological Society.

A field class of young folk has been started in Lacombe, and operations (all being well) will be commenced in the ensuing spring.

A most welcome assistance has been received from the Territorial Government in the form of an annual grant of $25 towards furthering the objects of the society.

Acting on the advice of the original supporters of the Society, it was decided to defer attempting the issue of a magazine for a year, and in the meantime the president has, without cost to the society, circulated a large number of agricultural papers among farmers whenever such papers published matters of interest in economic entomology.

Percy B. Gregson,

1st January, 1901. *President.*

Auditors' Report.

Receipts and expenditure of the North-west (Canada) Entomological Society:

Receipts.		*Expenditure.*	
Members' Fees	$26 00	Library	$26 00
Territorial Government Grant	25 00	Stationery	7 00
Deficit (met by President)	38 50	Meetings (Farmers' etc.)	23 00
		Printing account	6 50
		Cork, pins, etc.	5 00
		Store books, glass, etc. and other apparatus	8 00
		Expense account (postage, etc)	7 00
		Subscriptions to periodicals	7 00
	$89 50		$89 50

I hereby certify that I have examined the books and vouchers of the Treasurer of the North-West (Canada) Entomological Society and find them correct, and the above is a true statement of the accounts of the Society.

J. L. Tipping,

Waghorn, 1st. January, 1901. *Auditor.*

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ANNUAL REPORT

OF THE

BEE-KEEPERS' ASSOCIATION

OF THE

PROVINCE OF ONTARIO

1900.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF
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1901.

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TORONTO.

OFFICERS FOR 1901.

President, - - - - - - - - JOHN NEWTON, Thamesford.
Vice-President, - - - - - - - - J. D. EVANS, Islington.
2nd Vice-President, - - - - - JAMES ARMSTRONG, Cheapside.

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District No. 3.....M. B. HOLMES, Athens.
District No. 4.....C. W. POST, Trenton.
District No. 5.....J. W. SPARLING, Bowmanville.
District No. 6.....J. D. EVANS, Islington.
District No. 7.....A. PICKETT, Nassagaweya.
District No. 8.....JAMES ARMSTRONG, Cheapside.
District No. 9.....JOHN NEWTON, Thamesford.
District No. 10.....F A. GEMMELL, Stratford.
District No. 11.....W. A. CHRYSLER, Chatham.
District No. 12.....SAMUEL WOOD, Nottawa.
Ontario Agricultural College .....PROF. F. C. HARRISON.

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Representative to Industrial Exhibition Toronto, - A. PICKETT, Nassagaweya.
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Inspector of Apiaries, - - - - - WM. MCEVOY, Woodburn.
Assistant Inspector of Apiaries. - - - F. A. GEMMELL, Stratford

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DIRECTOR'S MEETING.

At a Directors' meeting following the annual meeting the following business was transacted:

W. Couse was re-appointed secretary, and Mr. Emigh treasurer.

The sum of $200 was appropriated to affiliated societies, but no society was to receive more than $20.

There was a grant of $25, $10, and $10 made to the Toronto Industrial Exhibition Association, the Western Fair Association of London, and the Canada Central Exhibition Association of Ottawa, respectively.

The President, Vice-President and the second Vice-President were appointed an Executive Committee.

The Executive are to arrange the programme for the next annual meeting, and set the dates of meeting.

It was decided to give the *Canadian Bee Journal* as a premium to the members of the current year.

Mr. DARLING and Mr. POST were re-appointed a committee to collect and forward to Professor Shutt of Ottawa different samples of honey to ascertain the percentage of water in them.

The Executive Committee were given full power to arrange and make an exhibit of honey, etc., at the Pan-American Exposition at Buffalo in 1901.

It was moved by Mr. HALL, and seconded by Mr. POST, that our very hearty thanks be tendered the Mayor, citizens and press of Niagara Falls for the very genial way they had treated us while we have been staying in their town. Carried unanimously.

The meeting then adjourned.

LIST OF MEMBERS FOR 1901.

Name.	Address.	Name.	Address.
Armstrong, James ...	Cheapside.	Kendrick, John...	New Dublin.
Beaupre, M. C.	Simcoe.	McLaughlin, H. D.	Vankleek Hill.
Bailey, John.	Bracebridge.	Martin, Wm.....	Belmont.
Brenton, F.....	Corbyville.	McLaughlin, Alex.....	Cumberland.
Brown, W. J.....	Chard.	McKnight, R.....	Owen Sound.
Boomer, A.....	Linwood.	Morrison, J. C..	Painswick.
Black, Alex.....	Sonya.	McEvoy, Wm.....	Woodburn.
Blais, Adolphe.....	Glensandfield.	Miller, F. J.....	London.
Byer, J. L.....	Markham.	McReas, A. R.....	Bearbrook.
Couse, W..... ..	Streetsville.	Munroe, D. W.....	Martintown.
Craig, W. J	Brantford.	McNaughton, A.....	St. Raphael.
Coggshall, W. L.....	West Groton, N.Y., U.S.	Newton, John.....	Thamesford.
Chrysler, W. A.....	Chatham.	Nolan, Dennis.....	Newton Robinson.
Comire, A. O., M.D....	St. Francois du Lac, Que.	Overholt, Israel	South Cayuga.
Colson, J. T.....	Purbrook.	Post, C. W.....	Trenton.
Calder, J. W.....	Lancaster.	Pickett, Abner.....	Nassagaweya.
Davidson, J. F..	Unionville.	Pellet, Morley....	Belmont.
Deadman, Geo. A.....	Brussels.	Pirie, John.....	Drumquin.
Dickenson, Edw. E.....	North Glanford.	Reaman, Josiah.....	Carville.
Demars, August.....	Chapeau, Que.	Roach, R. W.	Little Britain.
Darling, J. K.....	Almonte.	Root, E. R.	Medina, Ohio, U.S.
Davidson, B.....	Uxbridge.	Ross, D. D.....	Martintown.
Dickson, Alex.....	Lancaster.	Sheriff, G. G.....	Clarence.
Evans, J. D	Islington.	Switzer, J. F.....	Streetsville.
Edwards, Albert.....	Rockland.	Scott, Warrington.....	Wooler.
Emigh, Martin.....	Holbrook.	Smith, R. H.....	St. Thomas.
Edmundson, C...	Brantford.	Sparling, J. W.	Bowmanville.
Fixter, John.....	Ottawa.	Shaver, J. H.....	Cainsville.
French, Augustine.....	North Glanford.	Sibbald, H. G	Cooksville.
Feather, Alfred	Brantford.	Sleeman, Albert.....	St. Davids.
Gemmell, John.....	Lanark.	Somers, Wesley.....	St. Marys.
Gale, H. E.....	Ormstown, Que.	Salter, Jno. R.....	Wingham.
Gemmell, F. A..... ...	Stratford.	Storer, Jas.....	Lindsay.
Goodfellow, Alex.....	Macville.	Shantz, Aaron.....	Haysville.
Heise, D. W.....	Bethesda.	Taylor, Alex.....	Paris.
Hershisher, O. L.....	Buffalo, N.Y., U.S.	Timbers, John.....	Scarborough Jct.
Holmes, M. B.....	Athens.	Thomas, Joshua	Dracon.
Hand, E. G.....	Fenelon Falls.	Taylor, R. M.....	Port Dover.
Johnston, Geo. E.....	Bracebridge.	Wood, Samuel.....	Nottawa.
Jeater, Wm. H.....	Kincardine.	Wood, Geo.....	Erasmus.
Jackson, Sydney J.. ..	Bowmanville.	Wismer, Isaac G.....	South Cayuga.
Johnston, Henry.....	Craighurst.	Walton, W. S	Scarborough Jct.

ONTARIO BEE-KEEPERS' ASSOCIATION.

ANNUAL MEETING.

The twenty-first annual meeting of the Ontario Bee-keepers' Association was held in the Town Hall, at the Town of Niagara Falls, Ont., on December 4th, 5th and 6th, 1900.

The President, Mr. C. W. Post, took the chair, and called the meeting to order at 2.30 o'clock p. m., and after an address of welcome had been given by Mayor Slater, Mr. Wm. Couse moved, seconded by Mr. John Newton, that a vote of thanks be tendered to his Worship for his kind words of greeting and welcome, which was carried amid applause, to which Mayor Slater replied in a few well-chosen words.

The Secretary, Mr. Wm. Couse, then read the minutes of the last annual meeting which, on motion of Mr. Darling seconded by Mr. Brown, were confirmed as read.

FINANCIAL STATEMENT

Of the Ontario Bee-keepers' Association made to the Department of Agriculture for the year ending December, 1900.

Receipts.		Expenditure.	
Cash on hand from previous year.	$116 84	Grants to other Societies	$225 00
Member's Fees	111 00	Expenses of meetings	8 25
Legislative grant	500 00	Officers' salaries	75 00
Affiliated Societies' fees	45 00	Directors' fees and expenses.	197 01
For use of stenographer's report	12 00	Printing	10 00
		Postage and stationery	23 40
		Periodicals for members	72 15
		Reporting	35 00
		Executive & revising committee expenses	34 50
		Engrossing resolution of condolence	5 00
		Auditors' fees	4 00
		Total	$689 31
		Balance on hand	$ 95 53
Total	$784 84		$ 784 84

C. W. Post, President.
Martin Emigh, Secretary.

Examined and found correct this 5th day of December, 1900.

E. Dickenson, Jr. }
W. Craig, } Auditors.

THE PRESIDENT'S ADDRESS.

By C. W. Post, Trenton.

It is with pleasure we meet again in annual convention to discuss the topics of most vital importance in our fascinating industry. And why should we not all be imbued with a feeling of admiration, being located during our sessions in one of the most charming localities on the face of the earth. On the one side by the mighty cataract of Niagara, the "thunderer of waters," surrounded by its mystic charms, representing strength which,

if chained, is claimed would run the factories of the world, light every city in the two hemispheres, and turn the wheels of commerce ashore and afloat; all this we have on the one hand, while on the other we are meeting and associating with those who are near to us in the great battle of life. With all this in our favor I can see no reason why there should not be peace and harmony in our ranks during our deliberations at this our annual convention.

The past season has been very unprofitable for the production of honey. While a few localities produced an average yield, whole counties were a total failure. Now, while this is the case, what are the results: honey has again advanced to its old time price, and with a cleared market and paying prices we have good reason to be stimulated and encouraged for some time to come.

I will here mention that your Executive Committee in 1899 saw fit to assist in making an exhibit of honey at the Paris Exposition, expenses of said exhibit to be borne by the Department of Agriculture at Ottawa; therefore, it was arranged as a Dominion exhibit, your committee having no power to act after the honey was contributed for exhibition purposes, although a large portion of the honey was furnished by the members of the Ontario Bee keepers' Association, and, largely to our credit, Canada was awarded a gold medal and diploma.

It will be laid before you for your consideration, the advisability of making an exhibit of honey at the Pan-American Exposition to be held in Buffalo in the season of 1901. In this you will want to find out what assistance can be secured for the undertaking; whether it is going to be a Dominion, Provincial, or an Ontario Bee-keeper's Association exhibit, and last, whether there will be anything in it if an exhibit is made.

I am informed by our Inspector of Apiaries that under his skilled treatment and instructions, that dread pest of the bee-yard, foul-brood, is fast disappearing, and we look forward with every assurance that it will soon be wiped out of this Province.

There will be other minor matters brought up for discussion, and I trust that they will receive your consideration and be dealt with in a business-like manner. There is one subject that has lately occurred to my mind that I would like to see brought up and discussed at this meeting; that is, the advisability of this Association forming some line of defence to protect its members against jealous, ill-natured cranks or blatherskites who think that no person has a right to keep bees. I believe if they were aware of the fact that we stood together in defending our rights, and also knowing that we are fostered by the Government, it would make them think twice before entering their petty so-called grievances.

In conclusion, I thank you for your courtesy in electing me your President for the past year, and I trust that you will assist me in making this annual meeting one of the most profitable in the history of our Association.

Mr. C. W. SPARLING: There was one thing touched upon in the President's address which I could speak feelingly on, and that was in regard to ill-natured neighbors. I have had some unpleasant experience with them. One of my neighbors brought an action against me for maintaining a nuisance on my premises. We threshed it out before the magistrate a couple of times, and he sent the case down to the Assizes, but fortunately I won the case, at considerable expense. The worst of it was that he, making it a Crown case, was at no expense, although losing; whereas I had to bear all the expense of my witnesses, counsel and so on, which seems rather a hardship, but such is the law I believe. If we could organize a defence association I should cordially approve of it; I should be very ready to become a member. I live within the town limits, but on the outskirts of the town. The land around me is farm land. Next to me is a 100 acre farm. I have five acres of land where I live; the man across from me has four acres, and he is the man who complained. The man next to him has nine acres. You will see it is not within a thickly peopled part of the town. He complained first of the bees destroying his raspberries, and after that he said the bees were destroying his pears. In the Court he swore the bees came into the garden in large numbers and destroyed his flowers. He said the bees by sucking the juice from the sweet peas caused them to dry up. (Laughter). He got another neighbor, who grows raspberries, to swear that he considered he had lost twenty per cent. of his raspberries from the bees. He said he considered he had lost ten per cent. on his sales through realizing a smaller price, and he considered he lost ten per cent. on the berries that he was not able to ship at all. Another man said that the bees

came around his watering trough, and his horses would not drink on account of the bees. That was about the substance of his complaint, and of the evidence produced.

Mr. McEvoy: I think every man in the Province of Ontario should belong to the Bee-keepers' Union. It only costs a dollar a year, and it is the nicest way to settle up with these men. I have a case in mind where a man brought an action, but as soon as he found out he was up against the Union he dropped it I think it is in every person's interest in every village and town to belong to the Union.

Mr. F. A. Gemmell: We had some trouble in our own town. A party who kept bees came to me and told me he was going to be prosecuted for keeping a nuisance on the place; and, being a member of the Bee-keepers' Union, I sent and got some reading matter concerning the rules and regulations of the Union, and what they would do for anyone who belonged to the Union. I sent these papers to the lawyer who had the case in hand, and we never heard another word about it. I think it is a good thing to belong to the Bee-keepers' Union. Although the Union is nearly all American they defend their members, no matter what country he belongs to, whether Canada or the United States. Mr. Post was thinking probably they were rather too good-natured, and we should avail ourselves of an association of our own; but that Union has done good work in the past, and is still willing to do good work for us, providing we are members. Every case they have had in hand has always been won by the Bee-keepers' Union. If the lawyer had been served with those papers no doubt, as in this case, the action would have been withdrawn altogether. There was not another word about it.

Mr. Sparling: There is no need for him to drop the matter unless he wishes. It costs him nothing.

Mr. W. Z. Hutchinson: The Union is for the purpose of defending its members; that is the main purpose, but there is no line drawn as to where those members should live. The members in Ontario are in the same position as the members in the United States.

Mr. Couse: How long would you need to be a member before they defended you?

Mr. Hutchinson: You must be a member at the time that the alleged offence is committed. After a complaint has been made against a man he cannot join the Union and ask them to defend him.

Mr. Couse: If he was afraid there was going to be a complaint he could join.

Mr. Hutchinson: I suppose so, if he saw it coming.

Mr. Gemmell: When I wrote to the other side about this case I have referred to, I told them that I was a member, and that this party was afraid of being prosecuted but had not been as yet. They wrote and told me that of course in his case they would not take any action because they would not accept a dollar from a man who joined the Union when he found he was getting into trouble. But they were willing to send us all the literature bearing on the question, and we could place it in the hands of our lawyer. He forwarded the dollar, and they sent the literature.

Mr. R. H. Smith: I did not think we could get protection from the Bee-keepers' Union. I used to be a member years ago, but when it dissolved I thought the new Union did not accept Canadians.

Mr. Gemmell: That is a mistake. They accept anybody.

Mr. Smith: It is not necessary to be within a city to have trouble with neighbors that like to be unpleasant. There was a farmer in the neighborhood of where I had an apiary. He complained about the bees destroying his pears. I was away from home and he wanted them moved forthwith. I wrote him telling him that I would see him when I came home. He was not satisfied; he interviewed the different lawyers in town, but he could not find a lawyer to take the case up. He was told it was absurd that anyone should complain about keeping bees in country places.

Mr. J. D. Evans: In the case of a prosecution entered in the name of the Crown I think it would be wise if the precedents or decisions that have previously been rendered could be placed before the Crown Attorney. I think in that case possibly the prosecution would cease. If it did not cease I think it would be a proper thing for this Association to complain of any Crown officer who prosecuted in the face of the decisions. The difficulty is that these officials are paid by fees, and the more indictments they can lay before the Grand Jury the better they are paid.

Mr. HEISE : If those decisions were brought before the judges and lawyers, as Mr. Evans said, I think probably the case would go no further. I was somewhat surprised a year ago in looking over the list of members of the United States Bee-keepers' Union to find that there were only four Canadians on that list. Considering the protection it affords it is a dollar well expended to become a member of that association.

Mr. DARLING : I was going to ask Mr. Sparling on what grounds the judge decided in his favor.

Mr. SPARLING : It was purely on the legal aspect. The prosecution stated their case and my counsel, in addressing the judge, maintained that there was no case made. He said they had not established a common nuisance. It seems that to be a common nuisance it must be a nuisance to the community at large. It may be a nuisance to one, two three or four persons and yet not be a common nuisance. It would be in the eyes of the law a private nuisance and a civil action for damages would have to be brought. The case was dismissed on the ground that it was not a common nuisance.

Mr. DARLING : According to that, Mr. Sparling scored half a victory, but not a whole one.

Mr. GEMMELL : I am very glad to see the judge had so much common sense. It is quite different from a case where a man that kept bees was prosecuted for maintaining a nuisance, and had to dispose of the whole lot. It cost that man quite a lot of money. We are more enlightened now. If we had only had the aid of the National Bee-keepers' Union that man at Port Elgin would not have lost anything.

Mr. SPARLING : Was it a magistrate's decision ?

Mr. MCEVOY : It was down at Southampton before a jury. The judge charged the jury in that case, in favor of the bee-keeper. But it appears that that bee-keeper was rather cranky ; the other man, who was a blacksmith, had a pig-pen. They were not on friendly terms, and the bee-keeper forced the law with the blacksmith to make him move the pigs, and the blacksmith went to law with the bee-keeper to make him move the bees. The more popular man of the two was the blacksmith, and the jury thought if it was right to move one it was right to move the other, although according to law the judge charged the jury in the bee-keeper's favor. The case was appealed and taken to Toronto, but the judge did not like to upset the jury's finding. The man wanted to appeal and go further, but when we found out how it was we let it go. Mr. Deadman, of Brussels, had a case with a lawyer who was bound to move Mr. Deadman, the bees and all. He instructed his lawyer to fight it out, and the result was Mr. Deadman won the case.

Mr. HUTCHINSON : I think we should remember that while bee-keeping in itself is not necessarily a nuisance, it may become a private nuisance. If a man is going to bring a suit against his neighbors he should bring suit for civil damages If he can prove those bees have damaged him he may get damages. But the trouble in the States has been that people have gone to work to prove that bee-keeping was a nuisance *per se*, in itself, and that is where the point was turned every time.

Mr. POST : I think we can all agree with what Mr. Hutchinson says in reference to bees being a nuisance About three years ago I brought my bees home to Trenton a little too early. There was a large canning factory right in front of my place, and the bees made a raid on the pears, and they had to close down business for three days, and they had from two to three hundred hands employed. I never knew of it myself until a year after. I heard of it, and spoke to the proprietor about it. He said it was the case, but, he did not say anything about it because he knew it was not my fault. He said he knew it was the nature of the bees to collect sweets after the honey flow has ceased, and the doors and windows of the factory should have been screened. That man is at one extreme ; there are not many like that. I found another man who approached me one day I had a yard of bees about 30 or 40 miles north. He wanted to know when I was going to take them home. I told him about the first of August, which would be in about ten days. He said they were a terrible nuisance to him and did great damage. I told him that I was sorry to hear it, and if they were I would pay him for it I asked him what they were doing. He said they were around his watering trough drinking the water out of it. I told him he could place a piece of cotton over the trough. He wouldn't do that ; he would rather come down there four or five times a day with a broom to annoy the bees. I got a couple of salt barrels and filled them with water, and they all imediately commenced drinking out of the barrels. It is easy enough for us to guard

against these things. Wherever we have our bees located we should do all in our power to prevent our bees becoming a nuisance to any one.

Mr. JOHN NEWTON: I agree with the facts you have given. Especially when you come to small villages; we must try to live peaceably with our neighbors, and we have to sweeten them up a little. I know when I lived in the centre of our village the lady who lived next to me was complaining that she could not go outside the door without the bees coming after her. I did not know what to do at first. I did not want to move. So I used to hand her a section of honey now and again. Then she could not manage to hoe her potatoes, and I came to the conclusion that I had better get up an hour earlier in the morning and hoe her potatoes. We got on splendidly afterwards. I was not married then. (Laughter). When I was west of St Thomas on a farm we got along splendidly. They could cultivate their corn in a big field next to where the bees were, and we never heard any complaint whatever. The year after I went away, the gentleman who took care of the bees seemed to be one of these men who are forever rubbing folks the wrong way and ruffling their feathers; and the outcome of it was that the farmer said when he took his binder out, he had to take hold of it and draw it down the lane before he dared hitch his horses to it. Another cause of nuisance is allowing old comb to lie aronnd. I think every bee-keeper ought to take every precaution to prevent the bees, as far as possible, sipping at other things while there is no honey in the fields for them to get. With regard to fruit, I do not think bees will puncture fruit until it is so ripe that it is almost dropping off and wasting; and I think a fruit grower who does not pick his fruit until it is so far gone that the bees touch it, does not know very much about fruit.

Mr. DARLING: I think there was something in the *Canadian Bee Journal* two or three months ago about the fruit question. One man said he thought there ought to be a law framed that nobody should be permitted te keep bees unless he sowed bee food. I had quite an experience some years ago, and that experience has confirmed me in the statement made by Prof. Cook and many others that bees will not destroy fruit unless it is first broken by some other insect, or becomes unfit for use by over-ripeness. I had 150 colonies of bees sitting in one corner of an oblong field of about an acre and three-quarters; and not more than five or ten rods away I had a strip of Shaffer raspberries. They are very soft and unfit for shipping. They became riper than we could pick without crushing, and they ripened so fast that we could not pick them as they ripened. I had somewhere about a thousand plants. My bees went on those raspberries. The honey ceased coming in, but I failed to find them on a berry that had not ripened so much that the juices were between the seed containing parts. If the dew or a little rain or mist would start the juices flowing, then the bees would go at these berries. When once the skin that envelops the bulb that the seed is in becomes broken the bee will suck up everything that is in it. I handled fruit some time ago, and more or less of the damaged fruit I used to bring home, and I have seen bees on damaged pears so thick that you could not tell what kind of fruit they were on, and peaches the same; and yet, until the skin of the fruit was broken the bees would never interfere with it.

Mr McEVOY: You will find that a real practical fruit grower picks his berries up close so that they will be in good order for shipment. You will never hear any complaint from that man about the bees. I have four acres of strawberries, and I have no trouble of that kind because I pick them when fit for shipping. These fellows who leave the berries until they are wasting must not blame the bees.

Mr. COUSE: I think people are becoming educated to the fact that bees are a benefit, not a nuisance. I know at the present time I have two applications to take my bees to people's places. One man in particular says the nearer he is to my bees the better clover seed he gets. I know one person that goes in extensively for raising Alsike clover seed. A few years ago he was afraid there was not enough bees to visit his clover in the fields in the vicinity that our friend Pirie's bees were in. He said, "I cut my clover before it bloomed; and then every other person's clover was dead when mine was in bloom, so that his (Pirie's) bees could visit my clover." This man wants me to bring the bees to his field. I think we can go along this line and educate people. It is ignorance to a great extent and ugliness; they are a bad thing together. If you can educate a man to the fact that he is being benefitted you do not have very much trouble on this line.

Mr. GEMMELL: Are we not getting away from the point? Do you think it would be advisable for the Ontario Bee-keepers Association to organize an Association for the

protection of the bee-keepers of Ontario, or do you think it is just as well to let the matter stand the way it is, and let every man join the International Bee-keepers' Union?

Mr. McEvoy : Yes, emphatically.

Mr. Evans : I think it would be inadvisable to establish any other Union. We already have difficulty in getting members to join the present Ontario Bee-keepers' Association. I think the institution on the other side is ample for all our needs. I quite agree with the President, that there are circumstances in which bees become a nuisance.

MOVING BEES TO FALL PASTURAGE.

By R. H. Smith, St. Thomas.

In many of the best honey-producing districts in Ontario, the main crop of light honey is gathered from white and alsike clovers and the lindens, and in my locality the clovers yield from about June the 18th to sometime in July, depending on the state of the weather. About July 12th, if the season is favorable, the linden commences to bloom and bees start to work on it, and in some seasons they gather a lot of honey from this source. Unfortunately, it is very uncertain, as in the season just past it did not yield honey but for a few days, and then very little. Brood chambers are at this time crowded with bees and brood in all stages, with very little honey. What surplus they may have gathered will be in the supers or top stories, and, as is often the case, when all the clover honey is taken off and linden fails, the bees are in a starving condition by August 1st. Of course the wise bee-keeper will have provided for such a contingency by leaving some of the honey; but I have seen apiaries where this has not been done, and the bees have starved to death in August. In some localities, if there is sufficient rainfall, there may be sweet clover, catnip, etc., to keep the bees alive; but for a number of years in succession we have had dry summers, with the result of no bee pasturage in the latter part of July and August. When there is no honey being gathered by the bees the queen stops laying, and consequently all the bees are old when winter commences, and that is one of the main reasons for bees dying in such numbers in winter and early spring. A great deal of this loss may be prevented in some seasons by sowing buckwheat; but where there are many colonies the average bee-keeper may not be able to sow enough to have a succession of bloom at one time, or as it sometimes happens, there may be a large acreage in bloom at one time, and owing to unfavourable weather it may not yield honey.

Some of you may be wondering what all this has to do with moving bees. In my own case there is no buckwheat sown within reach of any of our three apiaries; but about from eighteen to twenty miles east nearly every farmer will have a field of buckwheat—from five to ten acres—and as some farmers sow it early it gives a succession of bloom from about August 1st to September 15th. While every patch may not yield much honey the bees usually get enough to keep up brooding, and when the atmospheric conditions are just right, as they are likely to be at least part of the time, it will yield abundantly, insuring their winter stores with some surplus, and what is quite as important, a fine lot of young bees. However, before we can have this, we may have to transport our bees to this location, unless we can provide for them at home.

To prepare bees for moving the bee-keeper has to be guided by a few simple rules: First, as the moving is usually done in warm weather they must have plenty of ventilation. One writer, when advocating a certain style of brood frame, says it is only necessary to fasten down the cover and put a wire screen at the entrance, and the hives are ready to load. While this may do in cool weather, or for weak colonies, it would never do for strong colonies in warm weather, as they would be sure to become too hot. I have usually moved full colonies of bees with the extracting super on, and this has to be fastened down with two strips, one each front and back; a wire cloth screen is fastened on top of the super, with screws so arranged that it presses the frame down on the top bars and prevents them moving sideways, and at the same time provides a space of about two inches above the frames, where the bees may cluster. The bottom board is fastened on with VanDuzen clamps. This preparation can be done through the day, and as soon as the bees stop flying in the evening the entrance screens may be put on with two small

wire nails. It is some trouble to smoke in the bees of thirty or forty colonies on a warm evening, so it is best, if possible, to choose a cool day. They are now ready to load, which is done by placing the hives so that the frames run across the waggon. I find a platform waggon with strong springs the best vehicle ; the one we hire will carry thirty two story hives in one tier, with covers, smoker and tools, or when they are light a few single-story hives may be placed on top of the load. Then I have my one-horse waggon that will carry from twelve to fifteen hives. I drive this and let the teamster drive on ahead, so that I can keep an eye on the whole. After some experience with hives that leaked bees, I found it a good plan to have a mosquito net to cover the load (especially when one has a nervous teamster), so that if any bees escape from the hives they are still confined and cannot scare either horses or driver. If possible I try and have everything loaded up over night, so as to make an early start in the morning ; the horses are trotted where the road is good, and we usually make the trip of eighteen miles in between three and four hours, so that the bees can be unloaded and released before the sun is very high. I believe some beekeepers move only the lightest or weakest colonies where they do not move all. My plan, if I cannot move all, is to move the strongest or those with the most bees that are fit for work ; then if there is only a short flow they are ready to make the most of it. The season of 1899 was very unfavorable for the growth of buckwheat and other fall bloom, and it seemed doubtful if it would pay to move bees, but I thought I would try a few and so took forty colonies. They gathered enough for winter stores and came out in the best condition in the spring. This past summer I took a larger number and they not only gathered their winter stores, but gave an average surplus of about 25 lbs. per colony.

I have come to the conclusion, that, where a beekeeper does not have full pasturage for his bees, it will pay him to move them if it can be found within a reasonable distance.

Mr. GEMMELL : I have had quite an experience in moving bees at different times of the year, but I never, until the present summer, moved them to the buckwheat. Years before, I have moved them in the fall to get the fall flow. I have used different kinds of ventilation, and different kinds of vehicles for conveying them. With regard to ventilation, it all depends upon what time of the year they are moved, and what time of the day. Mr. Smith says he just gives the super with a wire screened rim about two inches deep, and closes up the entrance with wire cloth That in my case would never have done at all, considering the distance I took mine. I had a wire screen underneath the hive and one on top ; the one on top had two inches of a rim ; and there was either a full super or a half super on top as well ; but I found before I had gone five miles on the road I had to water those bees or I would not have had any bees when I got to my destination. It was a close, murky, warm day. Their tongues were sticking out through the wire netting on top just like so many needles. I had to water them three times in a distance of about 35 to 37 miles. Coming home again we dispensed with so much ventilation. I had Mr. Newton with me to help me. We just had a wire screen on top, two inches deep, and wire cloth at the entrance ; and sixty-four hives were put on the waggon ; it wasn't a spring waggon, either. I had always used that before. But in this case we had an ordinary farmer's hay-rack filled with straw about a foot above the outside of the rack ; on top of this I had laid a platform of boards and thirty-six were put on there, and I think thirty-two on top of that again. We brought them all home, in one load, whereas I took part of them out by single rigs, and part by train. I had four trips in taking them out, and I brought them home in one trip, minus supers. In regard to whether it pays or not, I am not prepared to say very much this year because it is my first year. I am not sure whether it would pay every year to move them, but this year I think probably I was paid well enough for the trouble, but not anything more. I think I secured honey enough to pay for the moving, but I do not include the labor of taking them at all. That will have to go against the bees. I will be better able to tell next spring whether there will be more young bees, and whether they will be in better condition than those I left at home. I know that you can move bees in the fall short distances without any ventilation at all. I have brought bees home five and seven miles about the middle of November when they had a wooden cover on top and a wooden strip right across the entrance, but they were not closed for more than three hours at the most ; but you could not take them two miles on a hot day in the same way. The wire

screen in my case was all over the top; the screens I had in the bottom were also used in the summer time.

Mr. J. FIXTER: You first of all put a two-inch frame on the brood chamber and then put a wire screen on top of that.

Mr. POST: Do you move them in August, in the hot weather, without the super?

Mr. GEMMELL: I did not this year. I had a full story or half story on top; but I had to give them water. I started at five o'clock in the morning and we were on the way all day. The frames ran crosswise on the wagon.

Mr. NEWTON: I did not expect to have anything to do with this until my friend Gemmell wrote me. I never thought there was any great task in moving bees if you had the means ready and handy to do the work with. Mr. Gemmell undertook to move quite a long distance, for when you draw bees 38 miles it is quite a long trip. If I were moving bees that distance I would not leave it till the morning to start. I would start between ten and eleven o'clock at night, and draw all night, and I would be near my destination in the morning. At night is the best time to draw bees in the hot weather.

Mr. GEMMELL: I agree with you there.

Mr. NEWTON: Mr. Gemmell's experience was they were shut in the first night and all the next day, and on account of a storm they were shut in again the next night. That was a long time for bees to be shut in, in a hot spell of weather. I know in drawing bees at St. Thomas we used to leave about 11 o'clock at night, and we would usually reach our destination between eight and nine the next morning. That would be a distance of about 18 or 19 miles. It used to be twelve o'clock sometimes before we got started. And I think if you had started an hour or so earlier it would have been better. We made fairly good time the second day over the roads. You want your bottom boards fastened; a good-sized entrance on top. I like a two-inch entrance myself, or even more; and I do not think there is anything equal to an old hay rack with lots of straw for drawing bees.

Mr. GEMMELL: I endorse that. That is the reason I got you there. I did not know how to do it myself. I had very little faith in the thing before. I had always used a spring waggon, but I have come to the conclusion that a large well-loaded hay-rack is all right.

Mr. NEWTON: When I went Mr. Gemmell said, "Do you think you can get them all on?" I said "Yes, and a great deal more than you have got here." He said "Probably we had better go down to the hotel and get that light waggon done there." I said "No, we will take them on a hay-rack or nothing." We got them loaded, but we had not gone very far on the road when the horses got a little tired pulling through the hard sand, and the waggon rack began to shift back. Mr. Gemmell said "If we ever get to Eastwood we will ship them." I said "No, we will carry them through if the waggon will hold us up." After we got through Woodstock he began to brighten up, and we got to Stratford in good time. I think he felt satisfiied that the hay-rack was the proper thing to draw bees on. I believe in moving to fall pasture, but if we have got to move the distance that friend Gemmell has, I do not think it is a paying thing. There is only one thing to be gained by it. Even if we do not get as much as much stores as we expected, I believe the bees will be in that much better condition. When I saw Mr. Gemmell's bees and my own bees I felt sure his bees were in better shape than my own for going into winter quarters; there were more young bees in this hive when I saw them last than were in mine, because they were breeding upon the buckwheat, and the chances are that they will winter better on that account. I think next spring he will think he was paid for the moving.

Mr. SMITH: Mr. Newton, what advantage has the hay-rack over the springs?

Mr. NEWTON: The spring waggon has too much of a quick jolt.

Mr. SMITH: Does not that depend upon what kind of springs you use?

Mr. NEWTON: I have seen a good many. Mr. Alpaugh thought his was the best waggon in existence; you could put on probably about 16 or 18 hives; the faster you went the nicer it rode; if you went slowly and struck a stone the motion was so much the quicker. With the straw there is no motion like that at all. The straw forms just a gradual, easy spring. We put it a foot higher than the sides of the rack. Straw does not give the motion that springs give. You cannot get enough on a spring waggon to make it pay.

Mr. SMITH: In our section of the country they use springs such as are found in waggons that are used to draw milk cans on; that is a different kind of spring, but many farmers use them for drawing their loads on. You can get them at different grades, and they do not spring so very much, but still sufficient, and you can get a platform as large as you like and apply it to any waggon. Straw is not very convenient to us, but we find the springs I speak of just the thing.

Mr. NEWTON: I think any farmer is sure to have straw. I know that where Mr. Gemmell and I were we struck any amount of it.

Mr. COGGSHALL: The springs are all right, and there is a waggon such as is used in lumber yards; they are the thing to use. The hay is all right, but the springs are much more convenient; you have not got that bulky hay to contend with, and the extra rack on top, which makes quite a load.

Mr. PICKET: Mr. Coggshall has struck it. I happen to be one of those men who build those waggons, and I find that you can have the springs strong enough. Have them a good length so that they have not got this teetering motion. It is not the Armstrong spring that we want, it is what we term the hog-nose spring; get them heavy enough, so that they will take fifty or sixty hundred, and load up until your wagon will ride easy. I had a case in point. I had a son who was suffering from peritonitis, and some one said, "Can you move him on the democrat waggon?" I said that we could. There were two or three neighbors, and I said, "Just get into the waggon. I want you to get in; we will load the wagon down until it rides easy, and then we can drive as fast as we like." That is the kind of wagon we want, one with heavy springs, so as to take all the team can draw. If you have not bees enough, you can find stones or something. You are not bothered with shifting of the hives or any of those inconveniences; and they are quickly handled; they are within reach, and you can load and unload quickly.

Mr. HOLMES: There is a point that has been passed over by the gentlemen who have had experience in moving bees, or else I did not catch it; that is in reference to an attendant at the place where they left the bees, when such is necessary; and another point is as to the date when the bees were returned.

Mr. SMITH: In my own case I simply leave them with the farmer, and I leave them super room enough so that they are not likely to overflow or get up a swarming fever, and although they are there from the first week in August till the middle of October they do not want any further attention, only to see that the covers that blow off should be replaced.

Mr. DARLING: How late will those bees breed, where they have been taken to fall pasture?

Mr. SMITH: When we brought them home in October they were in all stages of brooding.

Mr. POST: I find when the buckwheat ceases to bloom the cool evenings come on, the brood diminishes very fast, and by the first of October it was out of the hives.

Mr. GEMMELL: That was my case.

Mr. POST: October is too early for me to bring my bees home. I bring them home about the first of November. This year I unloaded them the 7th November. I am determined they shall not be a nuisance to anyone in the town. I bring them home to winter. I do not move on waggons at all; they are all brought home on the train or by boat.

Mr. GEMMELL: That would be almost too late to leave them in case of bad roads.

Mr. HOLMES: In case it should happen that after you bring your bees in from the pasture grounds on the first of November it should continue to be cool and perhaps showery weather until you want to put them in winter quarters, what then?

Mr. POST: They are in winter quarters now without getting a fly, and I have never seen a particle of difference. I have brought them home in November, and I did not see a bee outside of the hive until they were moved out in the spring, and they wintered perfectly. This fall the last load I brought home was brought on a steamboat about eight miles, and they were then transferred to a car. It was on November 7th, a wet day, and they were unloaded the next day, and they were placed in the cellar, and I finished them on a Saturday, I think. They had no flight. But the first load did have a flight, and I have marked them to see if there was any difference, but I have never noticed any difference so far. I am speaking of other years.

Mr. BROWN: In that case it would be about as well to put them into the cellar immediately after moving.

Mr. POST: Yes. When I put them in the cellar they are simply out of the elements; they are set in the cellar with the windows and doors open; they are just under shelter you might say; they get the same pure air as though they were outside. They are left in that condition until after the holidays if the weather continues warm; that is, not extreme weather. I allow the place to be light; you can read anything in there.

Mr. GEMMELL: That is until cold, freezing weather?

Mr. POST: Yes. The cellar is as dry as this room.

Mr. BROWN: Do you find you lose any by their not finding their way back to the cellar?

Mr. POST: Do you think they fly? If a bee wanted to fly out and get lost I would be perfectly willing to let him go; it would be an old straggler that would come out before March.

Mr. SMITH: I suppose you would give them all the attention necessary, such as removing supers, etc?

Mr. POST: Certainly. When I extract the last time I have my feeders with me and I extract as I go along. The honey is drawn right from the extractor and put in the feeders, and the whole thing is done up as I go along. When I get through extracting I will guarantee they are all right for the winter.

Mr. DARLING: You feed extracted honey back to the bees?

Mr. POST: I do not want any surplus honey to go in the brood chamber. I feed with a top feeder, and I can feed thirty pounds at one feeding. I just weigh it right out in one bulk, and the next morning it is generally taken off and changed to the others. Sometimes there will be thirty or forty that do not require feeding, and then you will come to one probably that is quite light. You all know how it is; they will not be all alike.

Mr. DICKENSON: In moving bees does Mr. Newton set the hives right on the straw?

Mr. NEWTON: I make a flat platform of boards, and on that I put the first tier of hives. I put down some ordinary carpet tacks here and there so that the heads will sink both ways, into the platform or bottom of the hives, so that there is no shifting in any way.

Mr. CRAIG: The question before us is not so much whether moving bees pays or not. We have had some experience along the line of moving, and it has paid so far as the amount of honey is concerned, and the feeding up for the fall, but I think some of us have found, when the spring comes and the lighter honey is being stored, we have had trouble with the bees bringing up the dark fall honey from the brood chamber and mixing it with the light. That, I believe, is a great drawback to fall pasturing.

Mr. POST: They can be manipulated so that there will be nothing of that kind. I have a sample I can show you. My first extracting and my last extracting is water white, and they wintered on dark honey.

Mr. CRAIG: There is no doubt, as far as results are concerned; we have been satisfied that moving bees pays well. There was one season I remember we had pretty nearly one hundred pounds per colony of surplus after giving our bees plenty to winter on. We are in the city and we have the city drays and it gives us an advantage there. We can load on about fifty or sixty colonies, and the covering used, of course, is the wire screen as described. We have also used a portico screen in the front, which, I believe, is a decided advantage. This portico is the full width of the hive and, I believe, has a decided advantage in allowing the bees freedom that they would not have if the entrance had been closed by a mere strip of wire cloth.

Mr. NEWTON: I would say that the portico in front was a disadvantage for the simple reason that when you get to your destination if the bees are on the outside, as they are in a good many cases, when you take off the portico the bees are liberated and thus are lost. They will never find home; they have never had a chance of marking their location and they are gone forever. I think all bees should be kept inside until they are put out, and they will mark their location.

Mr. POST: The porticos also take up too much room in a car. If you want to put 160 or 170 in a car you do not want any porticos. Besides, in liberating, they are all right there in a bunch, and as quick as you let them out they are in the air at once. I

liberate my bees by the screen at the top. If the entrance is moved out and the sun cap is put on and the honey board, they do not come out with such a rush. I can put 160 or 170 in one yard, and they can go to work at once in gathering pollen. I have never seen them get mixed up and a lot go to one hive.

Mr. COGGSHALL: If you put on supers for extracting honey, just before the white honey comes, until they have got some of that which is below up there, you will have that dark honey in the extracting combs. Take them off and put on your boxes, and you will not only retard swarming but pretty nearly stop it by that way.

Mr. CRAIG: Have none of the members found this has been continued during the season; that is the matter of bringing up the dark honey from the brood chamber or is it merely in the first rush in the season?

Mr. POST: I convert my dark honey into bees. I do not put my surplus boxes on until the clover is yielding honey, and the buckwheat honey is all consumed before that. I keep uncapping and putting frames of honey in the centre, and I have a perfect brood nest from one side to the other.

Mr. DICKENSON: As to carrying dark honey up into the super, I think the difficulty could be overcome just in the way mentioned in the first place. Mr. Craig wished to know whether there was any member who had had experience in connection with the bees continuing to carry up this dark honey. The working up of this dark honey into brood I think is the right idea. Uncapping it right in your hive before the clover blossoms have come out at all, before you put on your supers for your good clover honey.

Mr. GEMMELL: I am willing to take all the risk of getting the dark honey; if I can get it I will take good care it does not go up stairs. What I cannot turn into brood I will have in such a shape that I can take it off, and that it can not get into the white.

Mr. SPARLING: I am in a locality where I usually get some buckwheat honey, and I can assure Mr. Craig that he need not be alarmed about the bees taking up the buckwheat honey into the clover honey. In fact I would not worry at all if the bees did take up a little in the sections to start with.

Mr. DARLING: A number of gentlemen here, yourself amongst the number, Mr. President, have intimated that we do not need to know whether there is much or little of dark honey in the hives—that there will be just enough and none to spare of this dark honey when the white clover honey starts to come in.

Mr. POST: I think if you get a powerful brood that they will consume the whole of it before the clover blossoms. There is enough to carry them through. If there is not give them something just before the clover comes in. Do not let them run out. I try to have my nine-frame Langstroth hives, without sun-caps on, weigh 75 pounds when they are put in the cellar; and I never have any too much honey.

QUESTION BOX.

Q. What are we going to do for bee pasture, seeing the foliage of the basswood is being destroyed by worms?

Mr. FIXTER: The attack began this year again by the caterpillar, but there is a parasite that is killing it so that our trees came out all right this year.

Mr. DARLING: There two classes of worms destroying the basswoods. We had a terrible pest in our section a year ago this last summer, in the nature of what is called the forest tree tent caterpillar. It made our basswoods look as if they had been riddled by hail. Instead of building a tent in the fork of the trees they have their web right along the limb, and as soon as they get a little larger they are found in clusters on the trees, but never in webs. I presume it is for this reason the term tent caterpillar has been applied.

Mr. BROWN: I noticed two years ago this tent caterpillar was very destructive on nearly all kinds of green foliage, but this last season very few of them could be found.

Mr. DARLING. There was a parasite around our section. I do not know whether others were troubled with it or not; it was a little larger than the one that has been referred to. A year ago this last fall, just when the tent caterpillars were in the helpless state of the cocoon, we had a large flock of blackbirds visit us for about half a day; they

made a terrible chatter, but they hunted in every nook and corner and destroyed every cocoon they could get. It is what is termed the crow blackbird.

Q. Which kind of bees is the best?

Mr. NEWTON: That is a pretty hard question to answer. I suppose we all think we have got the best kind of bees. For my own part I have had the cross with the Italian and the Black and they seem to be satisfactory to me.

Mr. POST: That would not answer in my case. I want the Carniolans crossed with the Italians, and a very small proportion of Italian at that. In my experience this season with two apiaries, one having 110 Carniolans and the other 108 Italians, the Carniolans through the whole season doubled the amount of honey gathered by the Italians. Besides, I got no increase from the Italians, and I got 65 from the Carniolans.

Mr. HUTCHINSON: How about the locality?

Mr. POST: I couldn't see any difference. They were five miles apart. When they were taken to the Murray Canal for Golden Rod and buckwheat there was no difference at all, I am sure, because they were within a distance that they could reach each other.

Mr. HUTCHINSON: You prefer the pure?

Mr. POST: No, I like them crossed. I began with pure queens, and I let them cross with the Italians first, and then I raised queens from those and they would mate them with what we call pure Carniolan drones.

Mr. HUTCHINSON: There would be a preponderance of Carniolan.

Mr. POST: Yes; they build up better in the spring. That is my experience from 1897.

Mr. GEMMELL: There is a great difference in Carniolan blood. I find there is quite a difference in the working qualities of bees from different Carniolan queens, just as there is from different Italian queens. Mr. Hall would tell you the same thing if he were here. He was at first greatly tickled with the Carniolans, and I don't think he cares anything about them now.

Mr. POST: I could see no difference.

Mr. GEMMELL: You probably got a good strain first.

Mr HUTCHINSON: Where did you get yours, if it is a fair question?

Mr. POST: From Mr. Holtermann. He was at my place, and we went hunting one day, and the wind blew very hard and we were disappointed, and he told me if I would send him a little string of game some day he would make me a present of half a dozen Carniolan queens. I sent him along some ducks, and he wrote me the next summer, about the middle of June, asking if I was ready for the queens and I told him yes, I was; and he sent them along and I introduced them. I do not know where they came from. I have kept bees as a specialty since before the organization of this Ontario Bee-keepers' Association, and I have tested all kinds of bees, and they are the only bee for me to-day.

Mr. PETTIT, jr.: Do you find any difficulty in hiving the swarms?

Mr. POST: We do not have any swarms to hive. When the basswood is in bloom or about half over, I make a two frame nucleus and give them a young queen, and then I move them to buckwheat, and I go through them after they are moved and give them two more frames from the old colony, and just let them go and they make the very best colonies I know of.

Mr. HUTCHINSON: Carniolans have been called great swarmers.

Mr. POST: I do not find it so. It was a case of superseding queens that caused any swarms I had.

Mr. GEMMELL: I do not think there is another man here who could handle the bees Mr. Post does and have so few swarms.

Mr. POST: My neighbors do it.

Mr. HUTCHINSON: What is your surplus from?

Mr. POST: Clover, basswood, and buckwheat.

Mr. CRAIG: I have of course been connected with the same bee yards as Mr. Holtermann for some years, and I perhaps know a little of the Carniolans to which you refer. I believe we have had the same breeds in our own yard, and yet my experience is different from Mr. Post's. It is strange. It may be locality, or it may be in the line of management. My own opinion is that it is more, perhaps, in the line of management than in locality. Ours is the eight-frame Langstroth hive.

Mr. POST: I don't think there is any good in them. I use a larger hive and give them plenty of ventilation.

Mr. NEWTON: I have always followed the same practice as Mr. Hall in breeding queens. I have always bred from honey-producing stock. If I find a good queen I have kept her and bred from her; and that is the way I think it should be done in every yard to get good queens for honey production.

Q,—Which is the best size for hives? eight, nine or ten frame?

Mr. NEWTON: I heard Mr. Craig say that his was an eight, and Mr. Post said his was larger. It is the same as the last question; we all have our own. I run a nine frame, and I think mine are the best.

Mr. POST: I use a nine. If I were going to change to a different kind I would have a ten-frame.

Mr. DICKENSON: I run a nine, which is between an eight and a ten, so I think I must be right.

Mr. SMITH: We have nine-framed hives. I think a ten-frame hive would be heavier than most of us would want to handle. I find mine satisfactory.

Mr. COGGSHALL: Mine are principally ten-frame hives. I have some eight-frame, but I prefer a ten-frame Langstroth for extracting honey. I have got Kidder's, and there are some eight frame hives that are equal to a ten frame hive; mostly all of them are.

Mr. NEWTON: I remember working in one yard where I think there were somewhere about ten different sized frames, and I think there are a good many that way.

Mr. HOLMES: Before that question is dropped would it not be helpful if the house were divided for a show of hands, so that we might really know which hive was received with the greatest amount of favor, the eight, nine or ten frame.

Mr. COUSE: That is a difficult matter to decide. When you mention a hive, what do you mean?

Mr. EVANS: Most bee-keepers think they have the best. I am an exception. I have the eight-frame Langstroth hive, and I do not like them at all and, only for the expense, I would change. It is all right for the summer time. I happened on a few of those old Jones hives, and they wintered the best last winter, and I had the most surplus honey out of them of any hives I had.

Mr. FIXTER We have been trying to test them and to prove which is the best, the eight frame or the old Jones, and two other hives. Of course the last two seasons have been so very poor we have not drawn any conclusion. So far the Jones frame gives us as good results as any.

Mr. NEWTON: I am afraid if our friend Hall were here he would be apt to get up and say Quinby.

Mr. GEMMELL: Or Hedden.

Mr. HEISE: I will take Mr. Hall's place. (Laughter)

Mr. NEWTON: If the members wish to take a vote on the question I am perfectly willing, but I do not think it would do any good.

Mr. HEISE: This is a question that has been discussed in the journals and at meetings all over. It is a matter that will have to be decided by every bee-keeper according to the locality in which he lives, and according to his particular management.

Mr. HOLMES: I will then withdraw my request for fear of getting further and further in the haze. (Laughter)

Q —Are propolis quilts an advantage or disadvantage on either supers for section or extracting frames?

Mr. NEWTON: I think the question might be answered by both "Yes" and "No".

Mr. GEMMELL: It is a disadvantage all around.

Mr. NEWTON: I do not know that there is any particular disadvantage in it when it comes to extracting honey, but in the case of comb honey it spoils the sections and makes them unsaleable. I read an account in one of the journals not long ago where propolis was becoming in great demand. If so we will have to try and get it on our quilts and scrape it off and sell it to the doctors.

Mr. DARLING: I thought the question might be quilt or no quilt.

Mr. GEMMELL: I should say no quilt at all.

Mr. SMITH: Would you use a cover instead of a quilt?

Mr. GEMMELL: Yes, every time. What is the use of the quilt? You cannot use it on top of the sections; it is of no use except to soil the sections.

Mr. SMITH: Not necessarily. If you use a proper bee space you will not get propolis on it at all.

Mr. McEVOY: Wouldn't it be better to have the proper man?

Mr. SMITH: Use an oilcloth.

Mr. NEWTON: That is a quilt all the same.

Mr. POST: I think a quilt is a perfect nuisance for either extracted or combed honey—a dauby, messy thing. A honey board is away ahead of that. In using the quilt for extracted honey the bees will build up propolis right along each edge of the top bar to the quilt if it does not lie down perfectly, and when you go to put the frame in the extractor there is a great lot of propolis to scrape down. It is always in the way, mussing up everything; whereas your top bars will be perfectly clean without a quilt. I never use a quilt, and I really think, from what I have seen of them in other yards, they are a great nuisance. There is five-sixteenths of an inch space between the honey boards and the top of the frames.

Mr. DARLING: You do not live in my section.

Mr. SMITH: We use the quilt that gives that proper space, too, without having any propolis on it, and if the quilt is made as we make them, of half inch bevelled slats and the cloth glued upon them and then painted, it will last for many years. It gives the proper bee space and we have no surplus propolis at all where the space is right. I would be afraid in a location where it was not shady that it might be too hot without a quilt. The slats afford a certain amount of ventilation.

Mr. POST: It is quite cool, too, in cold weather. I should think the board would be the best, take it all round.

Mr. GEMMELL: I never had any comb melt down on account of the heat. A shade board is laid on top of my cover.

Mr. SMITH: We do not find anything of that kind necessary. We use a quilt in stead of a shade board.

Mr. GEMMELL: I want a shade board every time unless I am under trees.

Mr. SMITH: Mr. Coggshall tells me he uses oil-cloth. Does he use it on sections?

Mr. COGGSHALL: Yes, on top of the sections, and then a Brussels carpet on top of that.

Mr. SMITH: Do not you find a certain amount of propolis along the edge of the sections?

Mr. COGGSHALL: Yes, some.

Mr. NEWTON: I feel sure that the proper way is to have quilts as Mr. Smith mentions. I find a great advantage in using a quilt. For instance, take it in the fall or in the spring when you want to look to see how full they are underneath, you have got to put your knife in and break open the whole top when you have the board. With the quilt you have simply to double it back and peep in; and then there is that great cracking sound with the board.

Mr. GEMMELL: It is not necessary to have any cracking sound at all.

Mr. DARLING: Mr. Hall one time said he had a strain of bees that gathered no propolis and very kindly gave me a queen. I told him the strain of bees or the locality might have something to do with it. The queen did not do any better than my own, although she was a fine bird when I got her; but her bees gathered in propolis as well as any others.

Mr. NEWTON: Mr. Post uses a quilt in the shape of a honey board. Mr. Smith's and mine is a board, and yet there is cotton under it and it can be easily rolled up and easily laid down, and every section is perfectly clean without any scraping. The same in extracting. They don't build that up; they are just as clean as the sections are on the top of the top bar.

Mr. HEISE: Another advantage of the quilt in examining a hive is that you can loosen a quilt at one corner, and you can put a little smoke in there and drive it right down to the brood chamber, and you can not do it with a board.

Mr. NEWTON: We will ask all those in favor of quilts to rise to their feet. (Eighteen rose).

Mr. NEWTON: All in favor of no quilt rise. (Twelve rose).

Q.—Is golden rod a good honey plant?

Mr. BROWN: My experience goes to show that it is. A year ago, in 1899, I had a number of bees from different colonies situated where there was a good growth of golden rod, and I found they went far ahead of those at the home apiaries where there was none.

Mr. NEWTON: All the experience I have had in late years is in connection with moving bees to fall pasture, to swamps where there was golden rod I know that that is the plant that gave me the greatest yields of the season, and I can only say from my experience that I think it is a good honey plant.

Q.—How to run out-yards for section honey without an attendant?

Mr. NEWTON: This is a question, I have no doubt, that would be a puzzle to every one of us present, because I feel myself that an out-yard for section honey cannot be run to an advantage without having some man in attendance, especially at times, in the fore part of the season at least. I do not believe it is an advantage to run an out yard for comb honey without an attendant.

Q.—Does any person present know if there is much or any of the disease known as black brood anywhere in the Province?

Mr. MCEVOY: There has been more or less of that in this Province for over ten years.

WINTERING BEES—IN AND OUT.

BY H. G. SIBBALD, COOKSVILLE.

Bees, to be wintered successfully, in or out, must be properly prepared, and although preparing bees for winter might more correctly come under the heading of fall management, still, on account of its vital importance and influence on the wintering problem, I cannot pass it without notice. By September our hives ought to contain a well populated colony and a good queen, young if possible; and before the 1st of October they should each contain not only bees and a queen, but twenty-five to thirty-five pounds of well ripened, well capped stores, in not more than six or seven average sized combs, with a division board alongside to keep all cosy, warm and dry.

Then if we are to winter outside, pack them up any time in October, placing two or three inches of sawdust, corkdust, chaff or leaves all around, and on top four or five inches. Provide a good water-proof cover, raise the hive about a foot from the ground, contract the entrance, and very little if any more attention will be required until spring.

But if we decide to winter indoors, which I prefer if a suitable cellar can be obtained, they must be left on their summer stands until about November 20th to December 1st, when a suitable day must be chosen, after they have had a fly if possible, and before sufficient frost has come to freeze the moisture inside the hives. Have your cellar ready, clean and sweet, stands arranged a foot or two from the floor and away from the outside walls if space will allow. Then a day or two before moving in the bees, loosen the bottom boards, place a new quilt or cover over any that have chewed holes in the cover, and you are ready.

Commence to carry them in by taking the one nearest the cellar, placing it to the further end of the cellar. Keep on down that row, up the next, &c., until they are all in. You will then have no difficulty in placing them back on their old stands in the spring.

But, to go back a little, the stands in the cellar ought to be two or three inches higher behind than in front so that our hives will sit slanting toward the front when in. Then raise the back of the hive off the bottom board and block it up width $\frac{3}{8}$ inch blocks, thus providing for perfect ventilation, the fresh air going in behind, passing up and through the cluster where it becomes damp and heavy, causing it to fall again and pass out the front entrance.

After placing one row on the stands and blocking them up, take off all covers except the propolized quilt, place two 1-inch strips on top, and you are ready for another row—repeat this until you have them as high as your cellar will permit, then start another row leaving room between to get in and sweep up the bees that die through the winter, which is all the attention they require until spring.

About the last of March or April 1st, they ought to be moved out. Preparatory to doing this go into the cellar with a candle and take a peep into each hive through the opening behind where the hive is blocked up, if the bottom board is clean and dry, the bees clustering quietly, etc., mark the hive O.K. It will not need any attention after setting out, unless when carrying it out you find it very light and possibly short of stores, in which case you will have to attend to it. You will find this a splendid plan, saving labour and fussing with the bees when they are better left alone.

Next gently take out the blocks and you are ready to set them out next suitable day. Commence taking them out orderly. The first to come out will be the last you put in and will go to the far end of the yard where it came from; follow this right along and you will soon have them on their own stands, with few vacant stands and all in splendid shape for a harvest of honey.

Mr. HALL: Mr. Sibbald is a very excellent bee-keeper. He commences very orderly in taking the hives from the yard into the cellar by taking first the stock of bees nearest to the cellar door and continues thus to the end. Supposing two of those stocks of bees dies, following Mr. Sibbald's system, that will put the balance of the hives on to the wrong stands and if you have any special hive of bees that have done good work for you, or which are cross, or whatever characteristic they may have, you have lost track of that stock of bees because it is on a new stand.

Mr. SIBBALD: If you lose one—which you should not do if you winter them rightly—you can leave the old hive there until you get them all out, or skip that one.

Mr HALL: We generally listen to them when we put them on the hand barrow; if the stock is dead we do not take it out. Your plan is very nice for taking them out, but allow me to tell you how we take them out. Our stocks of bees stand four in a clump; these clumps are all marked alphabetically, and instead of commencing near the cellar door we commence generally at the far end of the apiary and we take off one from each clump and take it in, and that leaves only three on a stand; we commence again and that leaves only two, and so on, and we take them out in the order in which they are put in. We do not take them out at the one time; if we do they spoil themselves. We have taken them out of the cellar all at one time, and they have created a great furore, and all try to get into two or three hives in one corner of the apairy, and those hives are of no use afterwards, and we have lost all those fine bees in the spring. In putting them into the cellar we take them from all over the apiary. They are in clumps of four, and we take one, and that leaves three; and commence again, and when there are two we commence again and leave one. They can never fail to go out in the same place again, and there is no rushing all into the one hive. As to the cloths, we do not like the cloths because they are dirty, and they blow away in the summer season when you are working and you have to get a boy to pick them up and fetch them back. If you have a good board it does not run away.

Mr. HOLMES: I would like to ask Mr. Sibbald if his paper said that the form for placing the hives on in the cellar should be so arranged that the front of the hive should be about three inches lower than the rear?

Mr. SIBBALD: Yes.

Mr. HOLMES: Then you said to put an inch block under the rear of the hive, between the hive and the bottom board?

Mr. SIBBALD: Three-eighths of an inch.

Mr. HOLMES: And when the next tier goes on top of that put on another three inches for the next row.

Mr. SIBBALD: Yes.

Mr. HOLMES: It occurs to me that by the time you would have put on three or four rows of hives you would have them pretty well tilted up. Would they not be in danger of slipping off?

Mr. SIBBALD: The top one would only have about three-quarters of an inch more slant than the bottom. Three times three-eighths—count that up?

Mr. SPARLING: Nine-eighths.

Mr. MCEVOY: We have a gentleman here from the United States who has some sixteen hundred and forty colonies,—Mr. Coggshall. We would like to hear from him.

Mr. COGGSHALL: I winter in sawdust outdoors. I never winter any in the cellar. I tried it once but did not succeed; the cellar was not right. I have always wintered

outdoors in sawdust. It would be a good deal of work to draw them home in the winter, I think. I use packed hives altogether, or large boxes that I pack them in.

Mr. SPARLING: How much packing do you use?

Mr. COGGSHALL: Two or three inches; some of them would have four inches. I prefer the sawdust because the mice won't work in it.

Mr. MCEVOY: About how far below zero does it go in your locality?

Mr. COGGSHALL: Down to thirty.

Mr. HALL: Did you ever try forest leaves?

Mr. COGGSHALL: I had one or two apiaries that had them in. They are an excellent thing; there is nothing better, I can assure you of that.

Mr. DICKENSON: I winter in the cellar. I do not know anything about outdoor wintering. Our friend, Mr. Coggshall, is an outdoor man altogether. I should judge he would be, because of the number of colonies he has. It would take a good many cellars, and pretty large ones at that, to hold all the colonies he has to winter; but I have been of the opinion for a number of years that bees can be wintered successfully outdoors or in cellars; it is all in knowing the two different systems. It is just as possible to winter in the cellar as it is out of the cellar. In numbering colonies, or having the colonies so that they will all go on the same stands again, I find a good way to do is just to number the hives so that there will be no mistake, because I think it is important that the colonies should go back on their own stands. I take a shingle or piece of board, or anything that is handy, and draw a few lines and mark the numbers so that I will understand thoroughly. If there is a blank there will be a blank marked on the plan. I find by having this piece of board marked in that way there is no trouble about getting the colonies back onto the same stands they formerly were on.

Mr. HALL: I will improve on Mr. Dickenson's plan. We put ours four on a stand, and in the fall when we are putting them in we mark on them, for instance, B North-west, B South-west, B North-east, B South-east; they are marked right on the front of the hive, and when we take them out of the cellar we run over them and put each hive where it belongs. I find it very essential to put them on their old stands for various reasons; there are some of them which are cross, others good tempered, others pretty, others are not, others good honey gatherers, others are not. We get acquainted with these individual stocks of bees through the summer, and if they get mixed up with others in the spring, we do not know where to find them, and the summer goes by before we find the characteristics of each stock of bees in the apiary, but by putting them on the same summer stand we have no trouble that way. We winter one of our apiaries in the country out of doors packed with leaves. If Mr. Coggshall will try leaves he will never go back to sawdust. I find sometimes my boxes leak, and if the sawdust gets wet the moisture won't dry out of it; it is different with the leaves and they last for years. I think packing with forest leaves is superior to sawdust and chaff. I prefer wintering them inside whether the quantity is large or small; it is much easier to carry them in and out again than it is to pack them. We winter 130 stocks of bees in a small cellar 12 x 12; we have a very nice cellar.

Mr. POST: I usually winter both indoors and out. This year I am not wintering outdoors on account of not getting my bees home in time to transfer them to the chaff hives. In the last three or four years in wintering forty-five stocks outside I do not think I have lost half a dozen colonies. My hives are filled in with sawdust four inches all round and two inches in the bottom, and permanently packed to remain winter and summer, and I have a cushion of about three inches of forest leaves that goes on top, and they are put in with a press so that there is a large quantity put in each one and a cloth over the top and bottom. That cushion goes over the top of the hive, and the sun-cap behind is raised up and rests on the top of that rim. That is the only way I can winter bees outside, and I have tried every other way. The sun-cap is a four inch sun-cap, and it telescopes down over the hive three-quarters of an inch, resting on cleats. I do not allow the cover to go down; I raise it up behind. About the first of March I shut it down; it is painted red, and it forms a regular hot-house.

Mr. HALL: We do not live in such a cold country as you. We have a large entrance; it is one-half an inch deep and five inches wide, so that gives a pretty large entrance and that entrance is four and a half inches down from the front of the box.

Mr. Post: My entrance is three-eighths of an inch by the whole width of the hive, and it is left open during the whole of the winter. I can not winter with a small entrance on the outside. Inside they are just piled in the cellar the way you all pile them; I raise them on blocks behind, similar to Mr. Sibbald. They are carried into the cellar now and the cellar doors and windows are open, and they remain open until cold weather sets in; they are just the same as if they were under a shade or cover outside. When extremely cold weather sets in the doors are closed and they are left to remain for the winter.

Mr. Holmes: Do you remove the propolis cloth for wintering?

Mr. Post: I do not have a propolis cloth; couldn't be hired to have one.

Mr. Hall: It is a dirty thing.

Mr. Gemmel: I am glad you have come to our rescue. I was defending the plain board for a cover and they voted it down.

Mr. Hall: They have not tried it or they would not have voted it down.

Mr. Gemmell: The only difference between us is in the way of doing it. I want to thank Mr. McEvoy for telling us about the leaves.

Mr. Miller: I wintered in doors successfully for a number of years by removing my hive from the bottom board when I put it in and I placed one hive on the top of two covers. Of late I have been wintering out doors with shavings; I like it much better than the forest leaves.

Mr. Gemmell: What is your entrance?

Mr. Miller: I leave the full width of the hive, one-half an inch, with a block at the front of the breach, leaving about an inch actual entrance.

Mr. Post: In wintering outside do you elevate the back end of the hive much?

Mr. Miller: I do, by putting packing under it.

Mr. Post: But the hive proper is raised behind?

Mr. Miller: Yes; I elevate it probably three inches; sometimes I remove the cover and sometimes I do not.

Mr. Smith: Do I understand that you use the cushion and put leaves right on top of the frame?

Mr. Post: There is a cloth laid over the top of the frames, although it is lined with cloth over the bottom, but I do that to prevent the bees in the early spring putting propolis on the cushion.

Mr. Smith: I was under the impression you didn't use a cloth. (Laughter.)

Mr. Heise: Mr. Sibbald in his paper mentioned four different kinds of packing; sawdust, chaff, cork shavings and leaves. I would like to know, in using those leaves, whether they are compressed or only put in loosely?

Mr. McEvoy: There is another thing, keeping the snow away from the entrance.

Mr. Post: I place a small piece of board in front of the entrance to keep the snow from drifting in and to keep the cold wind out.

Mr. McKnight: We have heard a good deal about the material used for packing. Chaff has been spoken of here. If chaff is ever put as packing on top of the hive no greater mistake could be committed, because it will absorb the moisture. What is up there should not be an absorbent; it should be a transmitter to allow the air to pass through, and not to confine it. Chaff will mildew at the sides. If it is kept perfectly dry it is right enough, but if the least dampness gets in it will do the same thing around the sides. I quite agree with Mr. Coggshall as to the utility of the sawdust. I question very much if forest leaves are any better than sawdust of the right kind. It answers the purpose and answers it admirably, but it is not every kind of sawdust that ought to be used No green sawdust should be used in packing. The sawdust that should be used is the sawdust you get in the planing mill from dry boards. Cork dust had been spoken of; that is better than any other material that has been mentioned yet, but it is a little difficult to be got. I think I was the first to use that. It is not to be had easily except in the neighborhood of towns, and then it is only to be had from grocers who bring in these Malaga grapes during the season, and quite a quantity can be collected in that way. As to Mr. Sibbald's reason for tilting up his hives in the rear and blocking them there to the extent of three-eighths of an inch, I am not sure as to the validity of his reason for doing that. If I understand him aright it is for the admission of fresh air, which he says passes up through the cluster and gets heavy and falls to the bottom and

paases out at the front entrance. I do not think that is just the fact. I believe the air that passes up through an empty surface becomes rarefied and lighter, and does not become heavier and descend to the bottom. And here comes in one drawback in the propolised quilt: it will not permit of the rarefied air that has been de-oxygenized or the oxygen absorbed out of it, to filter through the quilt. It is almost as impervious to either air or water as the board is. I think these forest leaves so packed is a capital thing for that; I believe they have a tendency to keep the interior of the hive dry and in good condition. Years ago I experimented on all kinds of packing, and latterly I became somewhat indifferent as to some of the methods that were advertised and largely advocated. A great many of the fads have passed out of practice altogether in bee-keeping, and I think a more common sense plan has been adopted largely from experience.

Mr. EVANS: I would like to know if any of the bee-keepers present have had experience in keeping bees in long clamps, eight or nine in a clamp, outside, packed in sawdust. I have kept mine for a number of years, and I have found some difficulty with some of them coming out very strong and some very weak. I believe there is that difficulty in keeping them in that way. I would like to know if any of the other bee-keepers have had any experience in that line.

Mr. MCKNIGHT: I have had sufficient experience never to try it again. With regard to a house specially constructed for housing bees, sawdust was then largely advocated for packing when above ground, but it does not do below ground. I would advise any man that was thinking of that kind of thing to never use sawdust. The reason is, no matter how dry it is it will dry-rot the posts that form the frame of the building. That kind of house was a great fad one time. I put up a house of that character, and I believe it was one of the best of its kind, but to-day it is pretty nearly ready to come to the ground.

Mr. HUTCHINSON: My experience of clamps was not such clamps as Mr. Evans had reference to. He had reference to the packing of bees above the ground where they would have an opportunity to fly. My experience has been in wintering bees in clamps under the ground, burying them like potatoes—pitting. I have had no experience in putting them in long rows and clamps in that way. The only object I can see is if a man is in a locality where he must protect them and he has no cellar, that is a makeshift that can be done, but that is all the advantage.

Mr. HEISE: I think Mr. Sibbald spoke about using four inches of top packing. Is that compressed or thrown in loosely? My reason for asking the question is that I think Mr. Newton referred to the top packing as ten inches and Mr. Sibbald four inches.

Mr. SIBBALD: Mine was sawdust. I never used leaves at all, although I believe the leaves are all right. I have wintered more in the cellar than outside, and I prefer cellar wintering. I would like to ask Mr. McKnight if he ever tried the system of blocking the hives up?

Mr. MCKNIGHT: No, I never did.

Mr. SIBBALD: I have tried both, and I am in a position to know, and I know from actual experience the air does pass in the back, up through the cluster and out the front, because at the front of the entrance you will often see drops of moisture, and at the back you will find it quite dry, and I thought from that that the air was surely passing from the back up through the cluster and out. Whether the air would be heavier after passing through the cluster or not, I do not know. But I have always thought when the oxygen was taken out of the air it was heavier and passed down. I may be wrong. At all events, the fresh air coming in the back would force the foul air out the front entrance.

Mr. GEMMELL: It carried the moisture down to the entrance?

Mr. SIBBALD: Yes.

Mr. SMITH: I think if Mr. Sibbald's temperature was high enough in his cellar he would see no drops of water.

Mr. HALL: It makes no difference about the scientific question as to oxygen or nitrogen. I raise mine in front because it is more convenient We raise them from one half an inch to two inches. The reason we do it is the combs come out sweet and clean in the spring instead of being mouldy; we do not give a rap whether the moisture goes in or comes out.

Mr. SMITH: I think if Mr. Hall would loosen the quilt a little at the top it would answer just as well.

Mr. HALL: I could not do it, sir. You could not loosen my quilt. We look a little ahead. We do not meddle with our stocks of bees when we put them out until it is warm enough for them to fly. If we want to look at them we look at the bottom, not at the top. I do not care anything about where the oxygen goes out or the nitrogen comes in. I know it keeps the combs from moulding. I have a board cover As the bees leave it, we prefer it that way.

Mr. SMITH: If Mr. Hall would loosen the cover the least bit, with the temperature right, the bees would all leave the bottom board; anyway that is a little on the slope.

Mr. HALL: My bees are hanging down below the bottom. The temperature in my place is 50, and as quiet as it is in this room. The temperature does not make so much difference if the atmosphere is pure. We have a door and window with a dark screen in it, and if you put your hand to the chimney you will find a tremendous draught of air; it is pure. If you go up to 50 degrees they do not mind it; if you keep them down to 44 they want to get out, they want to fly.

Mr. MCKNIGHT: I once saw a bee hive in a garden of the State of New York, and it had no bottom, and the combs were hanging down below the edge of the hive proper.

Mr. HALL: I went to a friend of my wife's—I didn't know the old gentleman till I got there. He was seventy-eight years of age. He had a row of bees—there might have been twenty or thirty. The fence formed the back of the shed, and then there was a roof to it, and he had the hives two deep in it. He had four poles running from end to end of this shed, and his box hives were set on these poles and the combs were hanging down fourteen, sixteen and seventeen inches. His reason was on account of the moth, and in that way the moths did not destroy his bees.

Mr. ARMSTRONG: I was going to ask Mr. McKnight why it was he did not succeed with chaff. I have wintered bees this last eighteen or twenty years, what I call successfully, with only from one to ten per cent. loss in the winter, and I use wheat chaff, oat chaff and sawdust, and I cannot see a particle of difference. I generally pack from four to six or eight inches of packing on top, pressed down with my hands. I leave a small space under the cover between it and the packing. I never let the packing, if I can avoid it, come up tight against the outer cover, otherwise the moisture will strike there, and the chaff will get damp and rot. If you leave a small space there there is never any trouble with the chaff getting damp or rotten. My entrance is five inches by three-eighths of an inch. I was also going to ask Mr. Hall if it was really necessary to have the entrance the full width?

Mr. HALL: If I had my choice in making packing cases again I think I would have it the full width of the hive. My entrance is one-half an inch by five inches.

Mr. POST: My experience is identical with Mr. McKnight's with using chaff. Forest leaves are the best.

Mr. HEISE: Was the chaff in the form of a cushion?

Mr. POST: No, thrown in loosely.

Mr. MCKNIGHT: It is worse in the cushion.

Mr. POST: The chaff was placed in the top story with a cloth underneath, but it got wet and mouldy; there was over 60 per cent. of the bees that were dead and the combs were blue moulded.

Mr. MCEVOY: One of the greatest drawbacks in the use of a cushion filled with chaff is that the bottoms of the hives get choked with snow; the steam rises and goes up into that cushion of chaff which will hold it, and then zero weather sets in and the chaff in the cushion gets frozen. With green saw-dust packing such as Mr. McKnight spoke of, if you use much of that, it is like a little refrigerator. If the saw dust is perfectly dry and not too thick, all right. Mr. Armstrong said he threw the packing on loosely. He lives away in southern Ontario and Mr. McKnight lives north. It makes a difference where you live; you may be both right.

Mr. ARMSMRONG: We never have it go much lower than 10° below zero, and it will not remain for more than two days.

Mr. POST: We get it from 10° to 14° below zero for ten days.

Mr. FIXTER: Has any one ever tested outside as against inside wintering in reference to the amount of honey consumed? Also, has any one kept track of the time consumed in packing as against carrying them into the cellar? I might as well tell you my

experience. I think there is more honey consumed than will pay for building a proper cellar. And in the time consumed and the trouble in packing one hive you will carry six into the cellar.

Mr. McEvoy : In the winter of 1888 I put one-half of my bees in the cellar, and the other half I packed and left on the summer stand. In both cases they had sealed stores. Where I had a very strong stock outside I brought it inside. They wintered pretty well in the cellar, I thought, and when I set them outside, as far as consuming the stores is concerned, they used rather more in the cellar in that case.

Mr. Fixter : Did you weigh them ?

Mr. McEvoy : No, but they did not have quite enough. They seemed to breed more in the cellar than they did outside.

Mr. McKnight : I think yours is an extraordinary experience in that connection.

Mr. Darling : There are several matters touched upon here and perhaps I could give a little experience along the same line. With regard to packing I have tried saw-dust and cork dust. I have not tried wintering outside at all ; I live where it is cold—too near the north pole. But for years I took off the propolised sheet and put on a cotton cushion filled with saw dust and cork-dust—I brought the saw-dust from the saw mill and sash factory—and I fail to see very much difference in their effect, only I thought the saw-dust from the saw mill was not quite as warm, and the cork dust a little dryer. There is that much evaporation from bees that if you take a little piece of lath and leave it lying on top of the cushion, without any cover on at all, if you lift that piece of lath up any time after it had been there a few hours there will be a wet spot on that cushion the size of that piece of lath. If nothing touches that cushion it is dry all winter long and the saw-dust is dry. Lift the cushion and put your hand under, and it is warm and cosy on top of the sheet, if there is a sheet underneath. I had formerly tight bottom boards, and that is the reason I took off the propolised sheet. Lately I have taken off the bottom board, leaving the propolised sheet on, and putting the cushion on ; that allows no moisture to get through ; but I raise up my hive at the front, I do not like going to the back to let them down, and I find that they winter just as well and better than they did without the propolised sheet and with the bottom board tight, and there is no danger of there being any dampness above and my combs and bees are not as damp as they were when the boards were tight. Somebody has said if the temperature were right there would be no moisture in the hives. That has been a matter that I never satisfactorily solved in my locality. Some of the hives, and not the strongest ones either, will be nice and dry while others will be so wet that the water will drop out of the entrance when the bottom boards are tight. I find a difference, and I cannot tell the reason why.

Mr. McKnight : How do you tier them up ?

Mr Darling : I made trestles of 2x4, and I tier them up three tiers, one on top of the other.

Mr. McKnight : Have you experienced any difference as to the bees coming out of the top row as compared with the bottom ?

Mr. Darling : I cannot find much difference. I find sometimes if it happens to be a little warmer the top row do not winter quite as well as the bottom. I find about 45° is the best temperature to winter in. You can see my bees, and there is not a bee flying out They seem to be very much satisfied with what they have now. My cellar is dry enough to sweep it every day of the year, and it is built in clay ; there is no rock or sand. The heat of the house above keeps any frost from coming in from the outside. The house is never banked. The cellar window on the south-west side of the cellar frequently has neither glass nor wire screen in it but perhaps some boards thrown over the outside and the snow will sometimes blow in on them, and I have noticed when the sun comes out a little there will be an air hole through the snow, in February. With regard to the amount of stores consumed inside and out, I used to weigh my bees in the cellar and weigh them out again and I found they varied a good deal. Some colonies would weigh only about five pounds less when going out than they did when coming in, and some would vary from ten to twelve pounds.

Mr. Post : I never thought there was nearly the amount of difference that a great many imagine. I find mine that winter in the chaff hives have just as much honey in the spring as those in the cellar and hold out just as long in the season—their honey holds out just as well after the spring sets in.

Mr. McEvoy: Mr. McKnight said that mine was an exception to the rule, consuming more inside than out. As a general rule it is. It all depends upon the constitution of the colonies, and how they are prepared for wintering. I want them to go into winter with sealed stores. Outside they do not begin to brood up until towards spring, but if the cellar is rather warm brooding sets in and they consume on that account; and I have just as much brood and in fact more outside than I would have had in the cellar. Just shut off the brooding and it saves the stores.

Mr. Gemmell: Have you found this brooding up in the cellar an advantage?

Mr. McEvoy: Positively no.

Mr. Miller: I fancy there is a point in regard to the consumption of stores that we are losing sight of. I find that bees wintered in the cellar, after being set out, waste their stores, as it were. They are breeding up and fly more continuously, independently of the weather, than bees that have wintered out on the stands, and at that time they are consuming stores more rapidly. I find the difference between the two rather in favor of out-door wintering, by the time my bees are in condition for the honey flow.

Mr. Darling: There is another point there. I am not prepared to say how much moisture the hives contained when they were set in and when they were put out. It might be that had considerable to do with the lesser or greater variation.

Mr. Pettit: You have that cushion on each hive?

Mr. Darling: On each hive.

Mr. Pettit: There is not so much moisture in the hive as though there were no cushion?

Mr. Darling: No, it does not condense there. Mr. Pettit's father gave me the idea first of setting my bees in. I set my bees in, and there is an inch more under the back of the board than there is at the front; then I put another inch under the hive front; that brings the hive up level again; then I put on a short block right on the front corner and another on the back corner, and an inch piece across that so that it leaves a space big enough to put my fist right in between the tier of hives. It is a long strip we used to get when we bought edgings from the saw mill. I put a two-inch piece behind and double that piece, and that gives my rise at the back of the board, and then I shove the block under the front corner again, and that brings it up and it makes the tops of my hives level again.

Mr. Post: By projecting up the rear of the hives would it not be handier for the bees to throw out their dead bees?

Mr. Darling: The bottom boards slant and that allows the dead bees to drop out themselves.

Mr. Hall: I think if Mr. Darling had noticed those hives covered with the cushions, and those simply covered with the board, and raised either the front or rear he would find no difference so far as the dryness of the hive is concerned. If the hive is raised an inch or an inch and a half in front it gives ventilation to two sides and the front. Nothing touches the bottom board but theback of the hive. There are no boards left on the bottom board. Speaking of how much to raise your hives, we use no strips; we want each tier of hives to be independent of its neighbors, and we pack ours four deep, and when we disturb one four we do not disturb their neighbors. I would advise those of the gentlemen who are afraid of the bees flying very much to simply use a wet towel; they fit tightly, and they won't blow off and won't shift. That is the nicest way to carry them out.

Mr. McKnight: How do you get up to the fourth tier in putting in and taking out?

Mr. Hall: One takes hold of the front and another the back part of the bottom board, and we set them on to a hand barrow. I have a clamp on all of my hive bottoms, and we fasten the hive to the bottom board by a clamp.

Mr. McKnight: I have found difficulty with three tiers.

Mr. Hall: We put ours up four tiers, and we would put them up five only the cellar is not high enough.

Mr. Post: Mine are six inches from the cellar bottom.

Mr. McKnight: I would not like to lift bees four tiers high in putting them into the cellar.

Mr. Hall: Ours are within two inches of the joists under our dwelling room, and if it was a foot higher we could put on five instead of four.

Mr. DICKENSON: You would not advise that if you had the room.

Mr. HALL: I fill up one corner of the cellar and leave the rest of the cellar for some other use.

Mr. DICKENSON: You would still put them up?

Mr. HALL: Certainly. Then you have got the other part of your cellar for other uses.

THE PRODUCTION OF EXTRACTED HONEY.

BY ALEX. DICKSON, LANCASTER.

In the first place, what is extracted honey? It is an article of food gathered by the bees from different plants, which they carry to their home, and deposit in combs made by themselves. When filled, they are taken out by the apiarist and placed in the extractor, and the honey is thrown out, after which we call it extracted honey. There are two grades of extracted honey,—good and bad. But you say how can we have good and bad honey? We get the poor honey when the beginner is too enthusiastic, and eager to get a large quantity, or for the want of experience, or having it canned before it is cured, which is a great mistake. The question would naturally arise in the mind of the beginner, "What must I do to secure a large crop and a good saleable quality?" Previous to the first of June see that your colonies are in good shape, supplied with young queens the fall before. June has now arrived. Watch close if the bees are beginning to whiten their combs. If so, put on the upper combs at once with perforated metal between upper and lower set; here is the secret of good honey and no loss of time with the bees. The first story being filled, raise it up, put another between the lower and the one you have just raised. But you say, "Why not leave it till the bees are done with the first, and then extract it?" Not so, for while the bees are capping the raised story, they are filling the second set. When the first set is capped from one half to three-quarters, it is ready to take off and to be carried to your extracting-room The above is what we call the tiering system. In the first place, there is no loss of time with the bees in capping; then, you have a better crop of honey so far as the bees can ripen it, and further, your bees are not over-crowded. You see it is quite evident if you extract your combs before they are capped over, you have a grade of honey just as the bees brought it in from the blossoms. If so, you will only sell that grade of honey to your customers once.

Now a word or two about our honey-room which contains our tanks. It only requires to be large enough to hold the number of tanks you require to use, with the roof partly glass and one large window facing the south. This room must be bee proof. The tanks should be sixteen inches deep, eight feet long and four feet wide, lined with the best of tin plate. As you extract your honey, have your tank covered over with cheese cloth, and a strainer set in made of wire, and cheese cloth under the wire. Strain your honey and let it stand to further ripen, for the temperature will run up to about 120 degrees in your honey room which is a good deal higher temperature than in the hive. While extracting is going on you need to be very careful not to leave combs lying around, for it may cause robbing. We will presume the clover and basswood are to a close. You need to go over all the hives and extract clean, before the buckwheat and fall flowers come on. When the season's flow is over, begin to take off combs at once.

I use the bee escape. I put it on in the evening and leave it on till next night, and so on. You will find the bees are all out by that time. I would not like to be without the escape at the close of the season; it avoids all robbing. The last honey you have taken off is dark; extract those combs that are not capped, over and those that are capped keep for feeding for the winter. When your combs are extracted put eight in a box, and place them no nearer than 150 feet from the yard and have the bees clean them out. Put them out late in the evening and leave out till next evening. Begin with three or four boxes the first evening till the bees find their way; afterwards you may put any number of boxes out. After all are cleaned up they are ready to be stowed away for the winter; you are now ready to tin and crate your honey. Have your tins thoroughly dusted, and label all honey intended for market. Have the tins put up in attractive crates, and not in rough boxes as many do. Put dressed lumber in the crates—it is very important to

have your honey nicely put up. There are many things that might be said on the production of extracted honey, but I would say in conclusion that you cannot have any cast iron rules to go by in the production of extracted honey.

Mr. NEWTON: Mr. Dickson mentions good and bad honey. I think that is a question we should never deal with, because we should always have a No. 1 article on the market if we desire to have our reputation preserved, and by putting this honey on the market unripe, as Mr. Dickson mentions in his paper, we will only supply our customers once. I cannot quite understand Mr. Dickson. He mentions in the first part of his paper about having it canned. I suppose he meant sealed; and later on in his paper he said that he took off the top story when they were one-half to two thirds capped, and at that time they were ready for extracting. I could not agree with the writer of this paper on that subject, because I believe if we want No. 1 extracted honey, we must leave it till every cell is capped in the extracted supers, and by the tiering-up system there is no doubt but that he could have the same and give the same quality as is produced with comb honey. I noticed particularly in the discussion this afternoon when they were asking about the extracting of quantities of honey, that they asked for comb honey, or else they asked for extracted honey from combs that had been completely sealed so as to get the right proportion of water in the grades of honey. I know that as far as the beginner is concerned, he does sometimes make a mistake in putting out thin honey, but we who know better ought to try and inform the novice in the business, and try to get him to leave his honey until it is in better shape. I do not agree with the writer with regard to the honey-room. I remember at our last convention we listened to a paper, I think by Mr Holmes, upon the production of extracted honey. He wanted a very large room; in fact he wanted a reception room in connection with it. Of course, the majority of us did not agree with that. We did not want too many visitors. We like to have visitors te see that we do our work cleanly and neatly, but we did not want a reception room where we had to entertain our visitors all the time. We want a place with lots of room to work in. We do not want a ripening tank, because we want that process to be done on the hive before the honey leaves there, and then we can safely can it as we take it away from the extractor and have no danger of it spoiling. I do not agree with the use of the bee escape. I think I can take off the comb by the use of the bee tent much more quickly than by the use of the bee escape. Among bee-keepers there are not many bee tents used in the apiaries. If there were more used there would be less robbing, and the work would be finished up in a better shape both in the spring and in the fall. With regard to cleaning out the combs, I cannot agree with the writer of the paper. He just wants to put a few combs out to entice the bees, then gradually keep coaxing them on. There is no trouble about that part of it. He will find if he puts them out on a nice bright morning he can take them in the same night, and he will find his combs are all clean without any coaxing about it; at least my bees will find them. I do not know whether other people's bees will or not. I quite agree with the writer that we should put our honey on the market in as attractive a form as we can. I believe what pleases the eye goes quite a long way, and when a rough article goes on the market it does not seem to sell as well as though it had a neat appearance. Whatever we do, whether in our yard or honey house, let us try to do it with neatness, and let us put our product on the market in the same shape, and I think we will succeed and get better profits on our returns.

Mr. HUTCHINSON: Would you mind telling us briefly how you worked with your bee tent in getting the bees off the combs?

Mr. NEWTON: My bee tent is about 5 x 3, and I think about 5 feet 4 inches in height. I just go and shake the combs, and take them away in the comb box, and shut down my hive. Is I were using bee escapes, I would put them on in the morning; I think they will go down better when they are active.

Mr. HUTCHINSON: How about the honey being of the right consistency to extract?

Mr. NEWTON: I believe, if my memory serves me right, it was Mr. Dickson and I who had some discussion along that line a few years ago. He claimed he could set them off on the ground here and there, and then gather them up and take them in. I told him I could not extract my honey that way; my honey would never flow after getting cool. I am sure that you could not cleanly extract honey that is sealed over and has stood all night, with a bee escape on, without warming up.

Mr. GEMMELL: If the night was cold?

Mr. NEWTON: It would have to be a pretty warm night.

Mr. HEISE: Is there any provision made at the top for bees to escape from the tents?

Mr. NEWTON: The whole top flies open when you want it and throws everything out. I use the tent considerably in the case of swarming. If I have two or three swarms and I do not wish them to go together, I use two or three tents. I just set one tent over the hive where the swarm is issuing, and then go to another, and so on in that way.

Mr. EVANS: How far are your hives apart?

Mr. NEWTON: My hives, I suppose, are four or five feet apart.

Mr. HUTCHINSON: You spoke about shaking the bees. Do you shake them off inside of that tent?

Mr. NEWTON: Yes

Mr. HUTCHINSON: If you used the bee escape you would not have to shake them at all?

Mr. NEWTON: No.

Mr. HUTCHINSON: Couldn't you put on bee escapes, and be busy extracting while the bees were getting off?

Mr. NEWTON: I meant at the close of the season when some combs would have some honey in and some had none.

Mr. HUTCHINSON: You have reference to the last time you would go to an apiary?

Mr. NEWTON: Just in the fall. The other time when the honey is coming in it is not necessary; then robbers do not bother any. In the fall when it gets cold weather a bee escape might work pretty slowly.

Mr GEMMELL: Do you really object to a bee escape in warm weather?

Mr. NEWTON: I must say I do.

Mr. GEMMELL: If you used one I do not think you would say that.

Mr. NEWTON: I have a dozen lying around. I will sell them cheaply.

Mr. SMITH: They are the wrong kind.

Mr. NEWTON: They are the best Porter escape; that is about as good as any made, unless Mr. Smith has something of his own invention.

Mr. HALL: We have forty-one escapes, and in extracting honey we do not use them except on the Hedden hive.

Mr. DICKENSON: I think we threshed this question out once before in regard to taking off honey after it was ripe. I do not want the escapes until the last taking off; that is, when we are finishing up when there is danger of robbing, for when the flow is on there is no robbing. It is simply a matter of taking off the crates eight or ten or twenty, if you like, at a time. Let the bees go out themselves. I have tried it over and over again, and I know how it works well and I have no difficulty in getting the honey out of those combs that I take off in that manner when I carry them to my honey-house. I endeavor to have my honey ripe. I think I can prove that, when I get the price my honey commands in the markets of the world. I do not know where the difficulty would come in with regard to not getting the honey out of the combs by simply placing them just at the back part of the hive, just in a place convenient, and let the bees go out themselves. There are very few bees that you have to shake at all, simply the few that cannot fly—the small young bees that have never been out of the hive before. You have to take those, perhaps, and brush them off the combs, but there are so few of them you frequently can take them out and carry them right away.

Mr. HALL: I think I can give you a pointer on extracting honey in large quantities. I got it from my friend Pettit. It is the quickest way to get the nicest honey and the most of it. He goes to the hive, and so do I, in the honey flow with a wheel barrow, and when we find any frame that is capped over, give them a good smoking at the top, pick them up and give them a shake and set them right on. Shove the unfinished ones to one side, and fill the balance up with new or empty combs. Then you can pick these combs up, and you need not shake them any more for they will brush off and they will not sting. You only need to take the ripe honey, and you can take it very nicely by that process, and you will get it without interfering with the bees at all. I want to say something about the honey-room. We do not want a honey-room in the honey flow. If you

put it off till after the honey flow you must have a bee escape or have a tent. I could not use a tent because my hives are under the trees, and there is no room for a tent.

Mr. COGGSHALL: With reference to the cleaning of combs, I let the bees all go in at once. I just throw the doors open, and let them go in, and they just clean it out in no time. After we have finished emptying the yard, sometimes forty rods away from any house, if we have to lock up the house we pull down the screen a little bit and pry open the door so they can get in there, we have all the honey secured so that they cannot get at it except what is in the comb, and they just clean that out at their leisure. In taking off honey, I just go and take it off and put it on the wheel barrow or cart. We go out with comb enough to fill the hives and take back full ones. We do that until we get the yard entirely empty. Three hands will take off an apiary of one-hundred colonies in a day.

Mr. HALL: Do you recommend the ripening cans?

Mr. COGGSHALLL: No.

Mr. HALL: I put them immediately into the packages they are to be shipped in.

Mr. COGGSHALL: We do not strain any; we have a honey extractor that has plenty of room below.

Mr. FIXTER: How do you get the bees off?

Mr. COGGSHALL: We lift the quilt a little, we put a little smoke in, and they are pretty nearly all gone in a minute or so, and then we give a little shake. We shake every frame.

Mr. MCEVOY: Mr. Dickenson uses two supers on top, and when you come back the bees have taken up the thin nectar, and you shake them off like dry sand from a board. It is the most ready way; with less smoke and feathers than any other. It is the best way.

Mr. DICKENSON: I come along after half an hour. The crate of honey will stand there till the fighting bees go out. That can be done without using smoke. Use a little smoke just to put your hands under. When you come back to get your crates of honey you certainly have to disturb the combs sometimes, but if there are any bees that are left you put them into a fresh hive.

Mr. HALL: You brush the young bees off?

Mr. DICKENSON: Certainly, occasionally.

Mr. MCEVOY: Give his plan a trial.

Mr. NEWTON: He does the same as we do, only he leaves his there waiting for a while, and we do ours up more quickly.

Mr. PETTIT: You just have one super?

Mr. DICKENSON: I always use two supers. I would not think of taking off a super of honey unless there is another super under it. I must have two supers.

Mr. HOLMES: There is one point in the paper with regard to which it seems to me either the writer has made a mistake or a slip has been made in some way. 120 degrees of heat in our work shop or reception room, if you please. If that is actually necessary to success then I must confess that I am not in it; I could not work in that heat. Another point is as to the manner in which he gets his comb cleaned up. If he but once put all his combs out on a nice afternoon, and saw what a beautiful picnic the bees made of cleaning them up, and then find the bees perfectly quiet the next morning, he would discard the notion of putting out a few at a time.

Mr. CHRYSLER: The question was mentioned to me of every fall supplying every colony with a young queen I do not think I would care to do that, or destroy some of my good queens and re-queen my apiary every fall.

Mr. NEWTON: That was a question that came up at our Oxford Society during our spring meeting and we had quite a discussion on the same point, and I think we came to a conclusion by vote that we would not discard the queens.

DIRECTORS' REPORT.

The Directors of the Ontario Bee-keepers Association have again to report a very poor season generally throughout the Province. The honey crop has been light, and often of a poor quality; in many instances no crop of any kind. We are pleased, however,

to report no inroads by disease or accident upon the officers of the association for the current year.

The usual sum of $200 was set apart for Affiliated Societies, of which $180 have been paid according to by-law.

The usual grants of $25, $10, and $10 were paid to the Toronto Industrial, Western, and Central Canada Fair Associations respectively.

About $10 was expended in sending circulars regarding spraying fruit trees to bee-keepers for distribution in their respective localities.

The financial condition of the Association is very satisfactory, there being nearly $150 in the hands of the Treasurer, which is quite an advance on last year.

The *Canadian Bee Journal* and a copy of the annual report have been sent to each member of the Association. All of which is respectfully submitted.

Mr. DARLING moved, seconded by Mr. GEMMELL, that the directors' report be received and adopted, which, on a vote having been taken was declared carried.

AFFILIATED SOCIETIES' REPORT.

There have been nine county societies in affiliation during the present year as follows: Glengarry, York, Brant, Simcoe, Halton District, Haldimand, Russell, Oxford, and Norfolk. Each society received a grant of twelve dollars and these grants have been largely expended as required by the by-laws.

The reports are not as full as desired in showing the amount of honey produced and the increase or decrease of bees, but the reason is perhaps that it has been such a poor season that many had little to report but failure and that is not pleasant to do.

The reports indicate this to have been one of the poorest years in the history of the Association.

W. COUSE,
Secretary.

Mr. PICKETT moved, seconded by Mr. BROWN, that those reports be received and adopted which, on a vote having been taken was declared carried.

INSPECTOR OF APIARIES' REPORT.

During 1900 I visited bee yards in the Counties of Lincoln, Wentworth, Brant, Huron, Perth, Waterloo, Wellington, Halton, York, Ontario, Simcoe, Lanark, and Russell.

I inspected one hundred apiaries, and found foul brood in thirty-three of them, and dead brood of other kinds in many others, which had been mistaken for foul brood. The first thing I did when I entered a locality was to pick out the best beekeeper in it, and get him to take me from place to place so that he could see how I managed the business, and, if required, he would make a valuable witness. I did this for the last ten years, and kept up a correspondence with the most of them, and by this means I always knew pretty well how all were getting on at the curing. At this work I burned a good deal of midnight oil, and sometimes I wrote all night and part of the next morning. Sometimes death and sickness in families delayed the curing, and in all places where I found this to be the case I went and did the curing myself. The following is a list of some of the men that went the rounds with me during the last ten years: Messrs. F. A. Gemmell, Stratford; J. B. Hall, Woodstock: C. W. Post, Trenton; Wm. Wells, Phillipston; Charles Mitchell, Molesworth; Martin Emigh, Holbrook; D. W. Heise, Bethesda; Abner Pickett, Nassagaweya; R. L. Patterson, Lynden; James Armstrong, Cheapside; W. A. Chrysler, Chatham; J. McPherson, Norval; E. Donnelly, Windsor; Sam'l Wood, Nottawa; J. K. Darling, Almonte; Peter Byer, Markham; James Nolan, Newton Robinson; John Fixter, Experimental Farm, Ottawa; John Calvert, Walsh; Alexander Taylor, Paris; H. E. Hoshal, Beamsville; Moses Vernon, Newmarket; Wm. Holden, Port Dover; A. Boomer, Linwood; J. Ward, Claremont, and Henry Couse, Cookstown.

I have here furnished you with a list of some of the men that I picked out "to pad the road with me," and taking them as a whole for good bee-keepers they will rank among the best, if not the very best, in the world, and I will leave it to them to say if I did not manage the whole business justly, very fairly and successfully all along the line.

Since I was first appointed Inspector I have had thousands of diseased colonies cured of foul brood, and very many apiaries that were once in a bad state with foul brood have not only been cured but have given some of the largest average yields of honey of any ever taken in the Province of Ontario. One of the treated apiaries gave an average of 200 pounds of clover and basswood honey per colony and fifty per cent. increase in bees, and had plenty of clover and basswood honey left in the hives to winter the bees. This yield was taken in a locality where no buckwheat was grown.

Every beekeeper I visited during the past season treated me in the most courteous way, and to them and the kind friends I mot everywhere who took me from place to place I return my most heartfelt thanks.

I also thank the editors of every *Bee Journal* for the valuable help they gave us.

My time, car fare and livery hire were $686.55.

WM. McEVOY,
Inspector of Apiaries.

Woodburn, December 3rd, 1900.

Mr. HALL: I move that we accept Mr. Evoy's report. I think he is just the right man in the right place. I think he has done very well in the past and I think we should give him a vote of thanks and recommend him for the future. (Applause.)

Mr. FIXTER: I would second that. I think we have had very valuable service from Mr. McEvoy, not only in the inspection of foul brood, but in other ways. At the different apiaries which I have visited, every one speaks in the very highest terms of his work. We get valuable pointers from him that we cannot get from any other person, because he travels the country from one end to the other and meets with all classes of bee-keepers and all kinds of troubles, and he is not one who likes to hide his light under a bushel; he will let it out. In fact I would like myself to see his field extended further than it is, and if we could appoint him as instructor while he is going around I think it would be very valuable.

Mr. DARLING: I would take pleasure in supporting this motion. I have known Mr. McEvoy for quite a long while, and I am mentioned as one of those who have gone around with him. I can say that his work as Inspector is not all that he does. He is a valuable man to bee-keepers outside of all he has to do in connection with foul brood. He has a practical experience, and is one of our best honey producers, and generally takes the largest crops. I believe there are very few who equal him, and none are better. I certainly have great pleasure in supporting this motion.

Mr. HEISE: I, too, am glad to support the motion.

The President then put the following motion, which was carried with applause: "Moved by Mr. Hall, seconded by Mr Fixter, and supported by Messrs. Darling and Heise, that Mr. McEvoy's report be received and adopted; that it is recommended that he be the Inspector of Apiaries in this Province for the future, and that he be tendered a vote of thanks for the valuable services rendered by him to this Province."

Mr. McEVOY: I give you my heartfelt thanks for the good feeling which is expressed in this motion. I always did the best I could. I sometimes had the thought that some of the members were of the opinion that I did not do what I might have done. I have done all I could; and I am thankful to you for the vote which is now given.

QUESTION BOX.

Q. What is the best method of marketing comb and extracted honey?

Mr. HALL: The best method of marketing anything is to find a customer who desires the article. If you find a man that wants it he will pay you the best price. If you cannot find him you had better retain your article. I find the best way to retain your customers is to put your article up in a marketable shape, so that it will not give them any trouble. I will give you an illustration. Last fall, or in the early winter, a firm from Rat Portage wanted me to place their order for three hundred crates of comb

honey and some extracted, and one reason, they said, that we want to secure your honey is because we like the way you put up your goods. It is not the quality of the goods at all. That did not give them any trouble, but the goods they had got from other parties were broken down, messy and sticky, and our goods were clean. They could handle them with satisfaction, therefore they wanted to place the order. I told them I was thankful for their kindness, but I could not accept their order. They wrote me again this season for comb honey, and I had to tell them it was too late. Therefore, the best way to market any goods is to find your customers, and give them something that they cannot, no matter how they try, find fault with.

Mr. SMITH: It is the practice with many bee-keepers in running extracted honey to run it into pails when it is newly extracted, and just store it and market it as the market calls for it. I find that the pails which have been filled and which lie around for some time are not in as nice a looking condition to supply to a customer as they are when the honey is freshly put into them. What is your experience?

Mr. HALL: I sell but precious little honey in small quantities except to those who come to the house. My favorite plan is to let the honey ripen in the hive before taking it, put it through my extractor, and the same day put it into the sixty pound tins and screw them down tightly and not let the atmosphere in; it will then retain the aroma as well as the sweetness of the honey. They come to me and want some of my choicest clover honey, and sometimes I haven't any. I give them a taste of the honey I have, and they say, "That is the nicest clover honey I ever tasted." I let them take it, and think as they please. Do not be too particular explaining what it is. Everyone wants thistle honey, and all pronounce it beautiful clover honey. If I told them it was thistle honey they would begin to cavil, and I could not supply them, and, therefore, I do not say anything about it.

Q: What is the best form of hive stand?

Mr. HALL: I would not like to answer that question; if I did I would have somebody shying a brick at me. I can tell you the hive stand I use. I use four half bricks. I have in the apiary some of the Hedden hive stands, but if I was making them I wouldn't use that kind. I use four half bricks. They don't rot themselves and do not rot your hives. I wouldn't like to say that it is the best form of stand; but that is the stand I prefer. They stay there all winter, and do not crack much. If they stand one winter, they will stand fifty.

Mr. DARLING: If you get those that are next the flue inside and which have become somewhat vitrified they will not take in the water.

Mr. HALL: They are the cheapest stand you can get. When I sit down to work at the hive my toes will go underneath, and if I stand up, my toes will go underneath; and the air will go in.

Mr. FIXTER: Do the toads get under them?

Mr. HALL: Yes. We used to try to kill them, but I think it is better to let the poor creatures alone now.

Mr. SIBBALD: I was out one night with a lantern, and a large toad came along. The lantern attracted the bees, and I saw them perform. The toad just seemed to open its mouth, and I saw him consume about seventeen bees in a few minutes.

Mr. SMITH: Do you find the bottom board warp at all with the bricks?

Mr. HALL: It is the best preservative you can find.

Mr. EVANS: Wouldn't a stand with a sloping board of some kind that the bees could crawl up when they fall to the ground be better so that they will not get lost in the grass?

Mr. HALL: They do not want to crawl up. If they do they can crawl up the brick. Once a week at least we cut the grass. Our bees are in clumps of four. We do not have to use a sickle where the bees are. setting; we just put down a little salt and that kills everything, and we have no trouble. We just run the lawn mower crosswise, and with the bricks you can go right up to the hives.

Mr. FIXTER: I might explain the stand we use. It is made with inch and a half strips the length of the hive, and we nail an inch strip across there about four inches off the ground for a lighting board; it is made on a slant and it comes right to the entrance of the hive; it is very neat in appearance and nothing can get under the hive. We mow our grass, but we cannot get close to the hive, so we put salt around or cut it short with the shears.

Mr. Post: My strips are nailed on top of the side pieces behind; that gives a ventilation at the sides as well as behind.

Mr. Fixter: The cleat that is on the bottom behind gives that ventilation, and it sets it up and gives it half an inch space and makes a very good bottom board. There is about a six inch lighting board in front of the hive; that is nailed on the stand.

Mr. Post: Mine is square in front. I cannot see much object in it, but the slanting board may have some advantage; it is an advantage for toads to get up on, but in shipping or handling in large quantities, as I do, they do not pack together so well.

Mr. Newton: I use the stand I use for winter packing. I never lift it from the stand during the summer. I use it for the summer stand then leave the rim there in the winter. I find the square point does not make any difference. I do not see much object in having the bevel because the bees can light on the front and run in.

QUEENS.

By M. B. Holmes, Athens.

The practical man contemplating the advisability of entering upon any line of work or business carefully studies the situation from every point of view, and, when fully convinced of its desirability as a lucrative venture, complies most assiduously with all the conditions necessary to the complete success of the undertaking.

That all business men are not thus thorough in calculation and execution goes without saying; and it is also perhaps safe to infer that bee-keepers as a class are not without their failings as well. But every bee-keeper knows, or thinks he knows, all about queens, and yet it would seem as though some, perhaps too many, bee-keepers as satisfied by merely knowing that *a queen* is in the hive without any consideration as to her qualifications or ability for the duty which she is to perform. The splendid hives and foundations of the day are certainly a boon which every true bee-keeper appreciates, but the great centre on which success most largely depends, that centre at which no master bee-keeper can err, is in securing "the good queen" for every colony.

What do I mean by "the good queen?" By the use of that term I mean the queen that will do the largest amount of work in a given time.

The late Lorenzo L. Langstroth, who has been justly styled the father of American apiculture, describes a good queen in that marvellous work of his on "The Honey Bee," as one who will lay three thousand five hundred eggs per day for several weeks in succession during the breeding season.

What bee-keeper of any considerable experience has not had occasion to note the difference between good, medium and poor queens? The colony with but a handful of bees, so to speak, will gain so rapidly in numerical strength as in some cases to exceed the more populous colony in the next hive in the actual amount of surplus honey stored; thus demonstrating that the good queen was in the colony which had wintered poorly, whereas the well-favored colony had only a medium or poor queen.

Dzierzon, the great German bee-keeper and scientist, says that queens differ much as the degree of their fertility.

Mr. Langstroth notes an observation made while transferring bees, by counting the eggs dropped on a black cloth in forty minutes by the queens of four different colonies. The first queen dropped but one egg, the second twelve, the third eighteen, and the fourth twenty eggs in the stated time. This observation was made in the middle of April, and on the fifteenth of July the colony of the first queen was very poor, the second was of average strength, and both the others were very strong.

Now, let us apply the result of this observation to practice and see how it would figure out. Take for instance an apiary of one hundred colonies, the avarage annual yield of which is, say, eighty pounds of extracted honey per colony. Let us suppose that twenty-five of the one hundred colonies are poor, fifty average and twenty-five strong; and then try and solve the problem as to how the average yield of eighty pounds per colony is obtained. The poor colonies will gather about half as much surplus honey as the fifty of average strength, or say forty pounds each, then, in order to get the average

of eighty pounds per colony for the whole apiary, the twenty-five strong colonies must gather one hundred and twenty pounds of surplus honey each.

Now, if in accordance with the observation and deduction of Mr. Langstroth as already noted, the difference between the poor, average, and strong colonies is attributable solely to the difference of queens, then we are forced to admit that the mere act of tolerating the twenty-five poor queens has incurred an expense of one thousand pounds of honey when compared with the average colonies, and three thousand pounds short when compared with the strong colonies, either of the items being sufficient to pay for all the *good queens* required and have a considerable balance to the good.

You may change the figures as you desire and the result will always show that the poor queens are heavy debtors with no prospect of paying, and should under no circumstances be tolerated. Keep the best and only the best, the *very best* are the cheapest in the end ; and the economy that prohibits the employing of the best queens is certainly a false economy.

The owners of Ayrshire, Jersey, Holstein or other stock do not stop at merely knowing that their animals are thoroughbred. Their ambition is that each individual member of their herds shall be the very best of its kind. And should not bee-keepers study their own interests by copying the example of the stockmen in this regard ? Yes, by all means, yes ! And one point more in this connection, and one which many bee-keepers scattered over the Province will do well to study and ponder carefully, and that is the fact that the stock-men find that it pays to be a member of the Provincial Association which is studying and advancing their interests.

Bee-keepers in the remote parts of the Province into whose hands the Government report may fall, will please make a note of this, and remember at the same time, that the Ontario Bee-keepers' Association is studying to advance your interests ; and like the stockmen you will study your own interest by communicating with the Secretary, Mr. Wm. Couse of Streetsville and secure membership in the Association which is trying to do you good.

And, now, I have already taken up too much time, and in conclusion I would say to those who have come expecting to hear a flowery dissertation on scientific queen-rearing, and to those who may have wished that their favorite kind or race of queens would get an advance in the address, that if such has been your anticipation I can only tender you my sympathy in your disappointment. I said at the outset we had met for practical purposes. I have endeavored to give you a plain, practical talk on the topic assigned to me, and I hope my address and the discussion which will follow may prove a practical benefit, not only to those gathered in convention here, but to many of our fellows who are not privileged to be with us.

Mr. McEvoy : That is the best paper on that subject ever written, in my opinion.

Mr. Post : I agree with you.

Mr. Fixter : Do you advise raising your own queens, or buying them ?

Mr. Holmes : Answering that I should say that I buy largely. I, of course raise a few queens but I buy the most of them.

Mr Hall : Mr. Langstroth and many other men go in for prolificness ; Mr. Holmes has got the same fad. Fad I would call it ; fad it is. All those of you who have taken honey, and have taken notice of the stock of bees you have received it from, will notice sometimes two stocks of bees equally strong in proportion. The one will gather three times as much honey as the other. The one queen is as profilic as the other. Is it the queen that does that ? I do not want the prolific queen except those coming from that queen are workers, gatherers in of honey. I have been so unfortunate as to have stocks of bees in my yard that will fill every corner of the hive with brood and consumes every ounce of honey for that purpose, and there is none for the apiarist.

Mr. McEvoy : Provided the queen that furnished a small quantity of bees, and the queen which furnished the largest quantity of bees, were equal, as far as workers were concerned, would not you rather have the one which produces the greatest quantity of bees ?

Mr. Hall : I have had stocks of bees in my yard that apparently were only medium I have had stocks in the same yard, perhaps alongside of the other, with three times the quantity of worker bees, and from all appearances supposed to be the same ; but at the end of the honey harvest the one which gave me the smaller quantity of bees would give

me the larger quantity of honey in the best marketable shape. Therefore, I want not the queen which raises the greatest number of bees, but the industrious bees, the bees which give us the honey. The honey is the only thing we are in bee-keeping for; if we are in it for anything else, I am not aware of it. The beautiful queen does not supply our wants. We do not sell a bee, or a queen, or anything but honey; therefore it is honey we want, and the honey bee we want. Mr. Hutchinson has honey bees, and if his bees are as he says they are, I think I would like to have some of them; but we do not want those prolific bees that fill everything you can give them with brood, and when they come to go into quarters they have not given you anything for their summer keep, and they have not got enough for themselves.

Mr. McEvoy: Mr. Hall did not answer my question yet. Supposing these are good working bees that you want, and you are going in for a crop of honey, and you say it is dollars and cents you are after, do you not want a queen that will produce three times as many of that race of bees if you can get it?

Mr. Hall: I want longevity in my bees. I want that both first and foremost. That is why I do not want to replace my queens every year, because if I do, I kill them and I do not know what I kill. If I keep them three years or four years, and they have done work for four years, wintered well, given us comb honey and in good shape, that is the queen I want to raise from, whether she raises few or many bees. It is honey we want, and we do not want short-lived bees. If you have a very large family, you may have a lot of puny ones that do not amount to anything; but if you have three or four sturdy boys and girls, they are worth something, and the results will be much more than from fifteen or sixteen weaklings. We want longevity as well as energy.

Mr. Post: I think Mr. Hall will admit that he will find more difference in the bees in the clover flow than he does in the fall flow. We all notice with colonies of bees of the same strain that one colony will gather double the quantity another will, and that is more likely to take place in the summer flow than it is in the fall, for the simple reason that some colonies become very strong in the spring, and the bees are the right age to gather honey, while others do not get strong until the honey season is on. They are full of bees; the bees are too young to gather. If you continue the experiment right through until the buckwheat and golden rod honey comes you do not see half of that difference; you do not see much difference.

Mr. Hall: I have kept bees for twenty-five years, and it is only in the last three or four years we have had any fall flow. Our honey crop shuts down about the 22nd July, and the bees that get ready for the harvest are the bees that give us the honey, and we select those bees to breed from because of their ability to be prepared for that harvest. The bees in the fall are of no use to us in my past bee experience. I told one man they were not worth twenty-five cents a bushel. We have our bees that come out of winter quarters, but they brood up on dandelion and fruit blossoms and are ready to swarm in the last week of May, which we do not want. We very often have swarms we do not want. We want those bees that are long-lived, so that they will be ready, as soon as the honey harvest begins, to gather the honey. The more bees you raise the more honey it takes to feed the babies. If those babies do not live long enough to gather that amount of honey we come short in the end of the season.

Mr. Post: I notice there is a great difference in the white clover season, that some colonies do so much better than the others; but I take them to the buckwheat fields in the fall, and I declare to you I can't see any difference. I think it is in the age of the bees.

Mr. Hall: If you only had an early season upon you, you would soon weed out those fellows that do not get ready for the early flow.

Mr. McEvoy: I will agree with Mr Hall as far as he has gone on this class of bees—that it is a business bee. I will admit that there can be a large quantity of bees that are worthless in a hive, and that they do not gather honey—and Mr. Hall has got a good strain—but if he has a queen in that hive that will produce just twice as many of that good strain, is not that a better queen? Because double the number of bees will give double the quantity of honey, and double the quantity of honey will give double the quantity of money.

Mr. Holmes: Answering Mr. Hall's objection and criticism, I think he brought out a good point there, that we sometimes have very populous colonies, and one colony here will be a good honey producer while the other there will not. It seems to me at least a

mystery. As to whether or not they are holding a council of war in there, and deciding as to whether they shall establish a new home somewhere, I do not know. However, I think if Mr. Hall will look a little further down in the paper, he will find a paragraph which will cover the ground which he has criticised. I say that our aim should be to get the best and keep the best. Of course, if we keep the best that is with a view to the best honey gatherers.

Mr. HALL: Your paper does not say so. You say those that are the most prolific. Langstroth was not a honey producer. He raised bees for sale; he wanted those that looked nice and laid a lot of eggs.

Mr. HOLMES: In my paper my intention was to refer to the stock producers, and not being satisfied with knowing that every one was thoroughbred, but to know that each individual of the herd was of the very best kind. I think if you read between the lines you will catch it.

Mr. MCKNIGHT: The paper just read by our friend Holmes is perhaps one of the best of its kind that I have listened to in connection with this subject during the long years I have been connected with this Association. It is a very peculiar subject that was assigned to him, and he has treated it well. The queen bee is a most remarkable creature. To use a paradoxical phrase, she is the mother and she is the father as well. The queen bee is one of the most remarkable in all history—in all nature in fact. He told us she will lay three thousand five hundred eggs in a day. What does that mean? It means about three times the weight of the creature which deposits them. Is there any other creature in creation that performs such an extraordinary feat as this? I remember once, I think it was in Brantford, that I said a few words on the queen bee, and I incidentally referred to just what Mr. Holmes has referred to now. The Dairymen's Association met in Brantford a few years ago, and one of the questions discussed at that meeting was the proper rations for a cow; that is, the daily food that would enable her to produce the greatest quantity of milk. I think I said then, and I will repeat it now, that the dairyman might take a lesson from the bee-keepers. If they could produce the rations that would enable a cow to produce three times her own weight of milk in a day, they would do something for their country. Will any of you tell me how it is possible, how it is that a creature like a queen bee can work up out of her system three times her own weight in a day? I have not the slightest doubt but that the queen bee has a good deal to do with her progeny, with the bees she produces, with the three thousand five hundred she produces every day for a certain length of time, but how our bee keepers can so handle it that the highest quality of the man will come from the mother, I do not know; I am sure I cannot tell.

Mr. HALL: They can only do it by selection. They cannot guide their ways; that is why I do not kill the queens.

Mr. MCEVOY: How do you know the best queen you have in your hive?

Mr. HALL: From the work she has done in the previous years, and from the work her babies have done in previous years.

Mr. MCKNIGHT: My own impression is that there is not so very much after all in the queen as people imagine.

Mr. HALL: It is her offspring.

Mr. MCKNIGHT: But the offspring is the product of the producer. Has the male bee nothing to do with that?

Mr. HALL: Yes, he has.

Mr. MCEVOY: You are both right.

Mr. BROWN: The subject has been so fully covered in the paper that I could see no point to contradict or even to raise a question upon. I can only indorse what Mr. Holmes has written. The paper has been a very valuable one indeed. I would fully agree with the writer that the selection of our bees is as necessary to a bee-keeper as the selection of his cow is to the dairyman. In the bee yard I have noticed that very often in the spring of the year there are some very weak colonies, and I find in letting them take their course that some of them will go the whole season through, and not come up with those that have got a good prolific queen. There must be something the matter with that queen; consequently I would discard her, if possible, because I think such queens are only a nuisance in the yard. It takes the greater part of the season for them to build up, and at the same time there is the consumption of stores; whereas, if they were out of the

way altogether I believe it would be much better for the yard. I am not a queen raiser. I never went into it, but I know that when there is an inferior queen in the yard it is better for the apiarist and for the yard for that queen to be taken out of it.

Mr. FIXTER: I think there is a great deal in what Mr. McKnight said about selecting the drones or taking good care of them. In stock raising the sire is looked to a great deal, and too little attention has been paid in that line by those who have been raising bees.

The Treasurer's statement, duly certified to by the auditors, was then read, and upon motion of Mr. Pickett, seconded by Mr. Smith, it was adopted.

THE USES AND ABUSES OF BEE LITERATURE.

By W. J. CRAIG, BRANTFORD.

I do not take up this subject by way of criticism of the matter and methods, or management of the present day bee literature, nor would I for a moment presume to teach or instruct its leaders. My object is to place before you, as clearly as I can, the fact of its importance, and of your responsibility in relation to it as individuals, and as an Association.

We live in an age of literature, and, whether in the form of newspaper, magazine, book or pamphlet, it wields a mighty influence over the individual and community in the moulding of opinion, the formation of character, the disposition of lives and the regulation of action; helping or hindering, making or marring, all with whom it comes in contact. This is true of all literature, whatever may be the purpose of its issue.

Bee literature in its various forms has taken its place amongst the literatures of the world, and, like the others which have preceded it, will help or hinder the cause it represents. By means of convention reports your debates and discussions are being put into permanent and indelible form to be circulated; hence, the necessity of your careful consideration of every new theory, scheme and invention, before being stamped with your approval. The opinion or ruling of one man is a dangerous thing, and so a question arises here: Should an editor edit? Spurious and misleading statements should not go unchallenged, for, like every evil thing they add to themselves as they pass along. Crop and market reports are important, and should be honestly, conscientiously represented, giving way to neither over-enthusiasm nor depression.

Hobbies are usually undesirable. They become tiresome in time; so also, does the pushing of the views and opinions of cliques, parties and influentials to the exclusion of those from whom they differ. The bee-keeping public look to the bee press for reliable information; they expect it to come from the very best and highest authorities in beedom. Unfortunately many of our intelligent and successful bee men are inclined, whether from modesty or policy, to be very reserved in expression of opinion and giving information. Let us rather believe it is from modesty. Bee-keepers are surely too broad-minded for us to attribute this failing to a meaner reason.

Is it politic to suppress the business of bee-keeping or to encourage it? This question, I believe, comes within our sphere of consideration in such a paper as this. A pamphlet has recently been issued by C. C. James, Deputy Minister of the Ontario Department of Agriculture, entitled, "The Teaching of Agriculture In Our Public Schools." He recommends strongly such an introduction. If this feature is favorably considered by the Educational Department, the science of bee keeping will no doubt follow and become part of our national instruction. Some of our people fear the result of such an introduction, but why should we in bee-keeping more than in farming or any other industry? If the production of honey is to become a source of business, commerce and wealth, it must be through the efforts of an intelligent and educated public.

In conclusion, we cannot recommend too highly such standard works as "Langstroth on the Honey Bee" and the "A.B.C. of Bee Culture," and no beginner should start out without having studied one, or both of these. They form an excellent foundation for a successful bee-keeper.

Mr. EVANS: I am very much pleased with the paper; there is a great deal of common sense in it, and I think it is fairly set forth. I think it is a very good thing for all

bee-keepers to get all the bee literature they can, read all the books they can, and get all the information possible. There are a couple of points to which I take exception. Probably I am a hobbyist in one direction—in opposing anything which promotes or tends to increase the number of bee-keepers. The principle of having bee-keeping taught in the public schools is one to which I take strong exception. I have not any use for teaching agriculture there, either. I think a boy raised on a farm knows more about agriculture than he can learn by all the cramming you can give him in the public school. I think the tendency is to over-work the children; their lives are made miserable when they should be developing muscle. I think instead of encouraging the teaching of these subjects in the public school we ought to try and discourage them and give childhood back to children. I do not think it would be a good thing to have apiarian knowledge taught in the public school. I do not feel under any obligation to do anything to spread the knowledge of bee-keeping abroad in the world. I do not think it is our duty, and I do not think that it is any of our business, or that any person should expect us to do anything to promote competition in our own line of business. I do not find any other profession does that. The lawyer does not ask to have law taught in the public schools. The doctor does not ask to have medical science so taught. They do not ask for the dissemination of knowledge with regard to any of those things by which they make their living, or that they should be made common and taught in general. There is another point I object to, and that is in connection with the production of honey. It is not on the same basis as other agricultural products. It is a luxury and not a necessary of life. It is not generally used like butter and meat and bread and those kind of things; there are only a few people in the world that are fond of honey. We have not the sale for it; it has no standard value like grain. It does not matter how much meat or beef or pork we produce in Ontario or how much we increase the knowledge of the production of it, we are not going to affect the price, consequently, it does not matter. We can encourage our neighbors and give them all possible information, and it does not affect us at all, because the price is made in a foreign land. It is not so with honey; we can easily overstock the market for honey in Ontario; there are bee-keepers enough in Ontario to produce more than the country can utilize; and, when we seek in any way to increase the number of bee-keepers, we are doing ourselves a great deal of harm. I think we ought to emulate the example of the other professions. For instance, take the journal which is devoted to medicine; you do not find there any reports as to the money the doctors are making. You do not find any advice given to young men to study medicine; you do not find anything at all that would tend in any way to increase the number of doctors. If a journal did that it would immediately be boycotted. Every doctor would try if possible to kill that magazine, by discouraging the circulation of it. A short time ago in the *American Bee Journal*, I saw a notice requesting bee-keepers to report the largest crops they had had, and I think they were a couple of pages taken up with reports of crops of honey showing what they had got. I think that is an abuse of bee journalism, and that is a thing bee-keepers should put their foot upon; we ought to keep quiet on those things. I do not say we should discourage any man from becoming a bee keeper, but on the other hand, we should not try to boom up the business and increase the number of our opponents in business. We have our interests to look after, first and last. I think the test of a bee journalist is to publish those things, and those things only, that are of interest to the men who produce the honey. I think the bee producers should know something about the crops each year. I do not think that would be difficult to get at in Ontario. We have a number of directors spread over the whole Province. I think if they were communicated with, they would give a fair idea of what the production was in each section. The difficulty has been in Ontario when there would be a good crop in one section, the bee-keepers did not know but that it was universal all over the Province, and consequently they got rid of their crops a little too soon. There are some fearful combinations in bee journals. When you get a bee journalist who is a supply man, in the spring the first head of clover he sees he cackles over it like a hen over a newly-laid egg. Honey is going to be rolling in and he advises everybody to buy supplies. There is another awful combination. If you get a bee journalist who buys honey, he carefully keeps back any failures anywhere, and he publishes good reports always; and after your honey is all gone, you come to find, when it is a little too late, that there was a failure in a good many places. I think the paper is an excellent one. I think the lines which I have mentioned

are the lines upon which a journal should be run, and if it is not run on those lines we should boycott the paper.

Mr. McKNIGHT: I admire my friend because he honestly expresses his opinion. I admire a man who does that, whether he agrees with me or whether he does not. I have known the gentleman's opinion on this point for some years past, and he has always honestly expressed his opinion, and he does it to day. His opinion is, as I understand it, that we bee-keepers should keep our secrets to ourselves, and not disseminate them to the world. That is all right if we were private people. But as an Association, we get $500 a year from the Government—from the people. What do we get it for? Why do the people of Ontario pay this Association $500 a year? It is simply that this Association should dessiminate a knowledge of bee-keeping throughout the country and thus increase the resources of the country. That is the reason why a grant is given to every industrial association in this Province, and that is the only reason. It is not that the few individuals should get that $500 and confine it to themselves and profit by it. Our duty here as an Association is, as long as we take public money from the people, from the public of the country, to give to the public some return for the money they give us, and we can only give them that return by disseminating the knowledge of bee-keeping throughout the Province, and thus increase one of the products of this Province and in that way enrich the country. Mr. Evans' opinion is all right if you confine it to a few people; but why should that gentleman or any other person connected with this Association expect the people of this country to give this Association $500 a year for their own particular and special and personal advantage? That is not the idea at all. If you want to confine your knowledge of bee-keeping to yourselves then refuse to accept from the country the $500 that you receive every year, and have received for many years. I say the duty of this Association as an association is to propagate the knowledge of bee-keeping and so increase the products of our country. I have no sympathy at all with my friend in his ideas as to what bee-keepers should do, and what this Association should do as an association. We were a private Association for some years—I know a good deal more about it than most of you do here. Most of those who were associated with me then are dead and gone. We worked this Association when we had no Government grant for a good many years, and I do not know but that it was just as successfully worked then as it is now. But we became an incorporated Association and we accepted a grant from the Government. What did they give it to us for? Was it to enrich ourselves individually? Not at all. Why should a man who has never been a bee-keeper and knows nothing about it contribute to the success of this Association his tax, unless it is that we should use our influence and our knowledge to develop the resources of the country? That is what this Association and every other industrial association of this country is organized for; at least, as far as the Government grant goes. I have no sympathy at all with a man who would take money from the country and put it in his pocket and give the country no return for it. I think that is just what my friend's theory would result in. (Applause).

Mr. DARLING: Mr. McKnight has intimated that Mr. Evans' idea is we should get this money and keep it and not give the country any return for it. I do not think Mr. Evans has that idea, but I will tell you what Mr. Evans did not make plain, and that is that there are other ways of spending this money for the good of the country that would be far better for the members of the Association, and for those who are not members and for those who keep bees and for those who do not keep bees, than it would be by teaching everybody to keep bees. I am with Mr. Evans there; but I do not think it would be the best thing for the men who are bee-keepers and those who are not to have all men go into bee-keeping. It was only yesterday a member said he had had applications to move his bees to their localities for their benefit, and the sooner we can get such educational items as that before the public, and get them to see the matter in that light, the sooner we are going to do the best we can for ourselves and for the others. I am thoroughly in sympathy with Mr. Evans' idea. To be honest to ourselves and our families we have no right to foster things in others which are going to take the bread out of our families' mouths; but we certainly have no right to claim for ourselves the privilege of all the secrets of bee-keeping, and keep the benefit to ourselves.

Mr. McKNIGHT: I know something about the efforts of the men who are promoting or trying to promote the industry of bee-keeping not only in Canada but in the British Isles. I had the honor of being the guest of the British Bee-keepers' Association once

in the Albert Hall. The British Bee-keepers' Association is composed of men quite different from what we are. They are men who do not live by bee keeping ; men who are independent ; in fact, titled men very many of them. That organization is composed of a class of men who are endeavoring to promote bee-keeping throughout the British Isles, England especially, and they are endeavoring to induce what are called the cottagers, the poor people who are living in little houses, to keep bees in order that they may increase their income. I do not know a single member of that Association who is depending upon bee-keeping himself. They are disinterested men and doing what they can to promote the industry of bee-keeping in England, and to encourage the poor people to make something more than they have been making out of their regular vocation. I think that is the true principle of any organization. Develop the resources of the country if you can. But if you want to be a close corporation, stick to it, and do not accept public money to enable you to do that. I say as long as we accept a public grant from the people of this Province we are bound to disseminate among t the people of this country all the knowledge we have, and I do not think that is Mr. Evans' view.

Mr. J. F. Beam : I think there are great possibilities in the honey line as well as in the dairy line. I attended some of the conventions of the first organization of the cheese men. The possibilities were marvellous ; the results have been marvellous ; farmers have been changing from less paying occupations to the dairy business. We have shipped some twenty-four millions of dollars worth of butter and cheese within the last few years besides consuming perhaps half that much. The idea is to get people to use honey. Let us not be afraid of competition. We can find a market for all the honey we can produce. The idea is that we are disseminating knowledge which will result in the production of better honey. I was in Woodstock and viewed my friend Mr. Hall's apiary once, and I was very much interested. I got many good ideas. We meet here to disseminate knowledge, and it is only the man who gets at the head of his business who will make the most money out of it. My good friend here has some splendid ideas, and perhaps he was misunderstood by Mr. McKnight. I think it is wrong for us to think that it is money to our pockets not to disseminate knowledge. We should rather get new ideas, improve on the ideas, and get people to consume honey. It is healthful for children ; why shouldn't they have the sweets? Then as this gentleman expressed the idea, it is beneficial to agriculture and to every other line of business. We must have rain to carry on the dairy business We need bees to fertilize. We need all these things together, and I would like to see the honey business develop and grow, and your association do wonderful work the same as the Dairymen's Association and the other associations, such as the cattlemen, the sheepmen and swinemen. A few years ago, they reported three million dollars worth of bacon ; last year, twelve millions of dollars worth. (Applause).

Mr. Hutchinson : I agree with Mr. Craig in what he says. I heartily believe in not putting our light under a bushel, and in simply looking to ourselves alone, but with the object of doing the greatest good to the greatest number.

Prof Fletcher : Our friend spoke in rather derogatory terms of a man that had a hobby. I have no use for a man that hasn't a hobby. I believe in cranks, because it is the crank that turns the wheel that makes everything go. (Applause.) And because a few poeple or many people call another man a crank it does not prove that he does not do some good in the world. The men who have done any big thing in the world, have been men who have been sneered at by other people who did not think it would pay. Every one of you should be men that have got the hobby of bee-keeping, and all doing it in the very best way. I am afraid of people who do not believe in hobbies.

Mr. Dickenson : I have always felt when I was running the bee industry that I had that as a hobby, but I had this also in view, to make it pay. I think if any person has a hobby that pays it helps to make him more satisfied, but I do think in any event it is necessary to have some hobby, and all the better if you can have a paying one.

Mr. McKnight : The gentleman who has defended the continuance of hobbies is a hobbyist himself, and he is a hobbyist who is doing good service to the country.

Prof. Fletcher : What is a hobbyist ? It is a man that has just paid a little more attention to the question which he is studying than any one else ; and why is he a nuisance to other people ? Because people do not like to be told about what they cannot understand and do not know. (Laughter).

Mr. Evans: The gentleman who has criticised my criticism has entirely misapprehended what I said. I did not utter one sentence in favor of suppressing any information in connection with bee-keepers, but I still oppose the teaching of this knowledge in the public schools. We disseminate knowledge; we have our doors open and everybody can come in here. We have our township conventions; we patronize and assist our *Bee Journal* and we give every member a copy of it and do everything in that way to disseminate knowledge. That is a different thing to what I object to. What I object to is the booming of bee-keeping, and trying to persuade the public that there is millions in it. We are not at all in the position of aristocrats, or of those people in England which Mr. McKnight has spoken of. We are in it to make something out of it; we are in this business to make some money. The English aristocrat is in it simply to help the poor, and as a philanthropist. We cannot afford that. If my friend is an aristocrat, and can afford to go into that business and spread the blessings to the poor, all right; but I am not rich enough to do that, and I do not know whether the rest of the gentlemen here are or not. The question has been raised as to cheese, but everybody knows honey is not in the same position as cheese. Objection has been made to the fact that we receive a grant from the Ontario Government. Well, if it is in our way let us do without the grant. We find other institutions receive a grant, and are not expected to disseminate the peculiar knowledge of their particular profession. Colleges are built and maintained and assisted by the Province where doctors and lawyers are educated, but they are not expected to go out and disseminate their information to everybody. A lawyer is not expected to give legal opinions without being paid for it; the doctor is not expected to go out and hold meetings in school houses and tell the people how to keep their health; and yet the Province helps these institutions.

Mr. Craig: I of course do not object to a man having his hobby and riding it all he wants to. There is a great difference in riding a hobby in journalism; you do not want to ride your hobby over every one else, and that is what I refer to in my paper. Just another thing, in regard to suppressing information as to the bee industry. The question is, is it going to pay? What is the use of us talking about an export trade, or what is the use of us making an effort in that direction if our aim is to suppress and keep in one little corner our own business?

Mr. Dickenson: I cannot let that remark of Mr. Evans'—with regard to honey as a product of this country not being the same as cheese and butter—go without having something to say. I simply stand in this position. If I had twenty thousand pounds of honey to-day I have got a man that will buy it; and every time I have made a shipment to England, I have got a letter back saying, "Repeat the order and double it if you can." I think that ought to be satisfactory to any bee-keeper in Ontario who is in danger of getting an over-supply of good first-class clover honey.

A PAN-AMERICAN HONEY EXHIBIT.

Mr. Orel L. Hershiser of Buffalo, N.Y., was introduced, and after describing the plan and scope of the exhibition thus referred to the proposed honey exhibit: What bee-keepers will get at the Pan-American depends almost altogether upon what they want. The management of the Pan-American are willing to do almost anything that the bee-keepers want; so you must not be modest in your demands. I think it would be well for this Association to appoint a committee at this meeting to look into the matter thoroughly, and if possible come up to Buffalo and look over the situation, and see just what you may expect if you make an exhibit there.

Now, it was intended some time ago to place this apiarian exhibit in the agricultural building, but the demand for space in that building became so great that it is now contemplated to construct a building especially for apiarian products, and it is quite important to know, just as soon as possible, what the demands of the bee-keepers will be in order to know how large to construct this building. There are plans being made to have an exhibit of bees, to have bees working there just as they do in your apiaries at home, in order to show the public just how honey is produced.

Some remarks made by a gentleman in this room a few minutes ago brought out the idea with me that he was not in favor of people knowing very much about bees and

honey. I think it is a good thing to let everybody know about bees. There is no danger of too many people engaging in it, because there are too many people afraid of bee stings. Once in a while a person thinks he has ability to keep bees; he goes into it with a rush, but he soon goes out of it again; and so I am not afraid of that at all. I am in favor of somebody going into the public schools of our large cities and teaching the children where honey comes from; teaching them something about bees so that they know there is no such thing as a "king bee," and things of that kind; so that when they know it is impossible to duplicate comb honey, and that when they buy comb honey they know they are getting comb honey and are not being fed on sugar.

In New York State the Board of General Management have been very liberal and have come forward without any coaxing at all and have done all that could be reasonably asked for the exhibit of the State of New York. And in what little I have had to do with these exhibits I have never been modest about asking for what I thought we ought to have, and I never got less than I asked for, and I do not believe you will, if you go to your Government and ask for a good liberal allotment I do not believe you will fail to get it, because the bee-keeping industry is much more important then people generally and even bee-keepers believe.

Some time ago, I read an article, I think by Mr. Converse, in which he quoted somebody as proving that the English nation would become extinct if it were not for cats, because cats destroyed the mice, and left a place for the bees to nest, and that fertilized the clover, and hence the production of those dairy products that are so necessary to our existence. I think it could be reasonably contended that if it were not for the honey bees the English people and the American would become extinct, for if it were not for the honey bees we would not have the fruit we need so much to ward off the dangers of dyspepsia and other diseases that would soon make the race extinct. But, while the dairy industry has become very important, and there are millions of dollars invested in it, there are not nearly so many dollars invested in the dairy industry as there are in connection with the fruit industry. One could not very well survive without the other.

That is about all I can say about the Pan-American. Just come up there and look it over and make up your minds that whatever you want you will get as to space and the people of the United States will be very glad to entertain you, and we will do the very best we can by you. We want you to come there with the determination to put an exhibit to excel any of the exhibits that are made by the states of the United States; and the others, especially the State of New York, will make just as big an effort to see that your expectations are not quite realized; so that there will be friendly rivalry. We will come together as friends and depart as friends, and we will be all the better for it. (Applause)

EXPERIMENTS WITH FOUL BROOD GERMS IN HONEY.

By Prof. F. C. Harrison, Ontario Agricultural College, Guelph.

During the last year I have been in Europe, and whilst there I made the acquaintance of a famous apiculturist, Monsieur E. Bertrand, of Nyon, in Switzerland, with whom I had many talks over the subject I am speaking on to-day, and I was astonished both at the time and subsequently at the different treatment used for curing foul brood practiced in Europe and practiced here. I may say in a word that both in the United States and in Canada starvation methods are much used for the treatment of this disease. In Europe we do not find these methods used to any extent. Monsieur Bertrand told me he would not recommend in his journal *La Revue Internationale D'Apiculture*, the methods as practiced here, but rather those which may be termed chemical or drug treatments. About three or four years ago your then president, Mr. Holtermann, asked me to conduct some experiments in this line of work. I did so, and I read a short paper on my results at your Toronto meeting. Since then I have prosecuted my studies in this direction at various odd times, and have written and published in French a paper on this subject which will shortly appear as a bulletin from the Ontario Department of Agriculture; and what I am about to give you this afternoon is taken from that which I

have written in Switzerland, and I trust that you will patiently wait for the rest of the report, which is far too lengthy to give you now. I might also state that I had thought it expedient on account of the meagre and small amount of literature accessible to the ordinary reader to practically monograph what has been written about foul brood, but in doing so I have not attempted to give the opinion of every bee keeper. The number of bee journals is, in itself, appalling, and I could not commence to collect all of them, although I have had access both here, in the United States, and in Europe to many of the best, and if I have omitted any good paper or any paper which has been shown to be the result of experimental work I must express now my regret for the omission, and if I had such a copy I am sure I would include it in a subsequent issue.

What I intend doing this afternoon more particularly is to run over briefly a few of the facts which others in the past have found, leaving the discussion and the experiments which I have made for you to read at your leisure. I would sooner do that than introduce a more controversial part of the subject at this time, and probably at a subsequent meeting of this Association I could then explain a little more fully any of the points which you might wish. I shall confine my remarks largely to an historical resumé of the subject, the geographical distribution of the disease, and some of the economical aspects of it, and although this may be rather fragmentary, I may mention something about the symptoms as the outcome of the historical resumé. [Prof. Harrison then read portions of Bulletin 112 since issued by the Ontaric Department of Agriculture.]

I trust these facts will be helpful in causing a little more thought. I have been criticised several times by people saying, "Oh, what do you know about this? You are not a practical bee-keeper, and your results are worth very little." Still, at the same time, I will say this, I have had an opportunity, since being away for over a year, of having very practical advice and also the use of several apiaries put at my disposal. It has been my misfortune to be unable, in conducting experiments on foul brood in this Province, to infect bees on account of the foul brood law; and being a member of the Ontario Agricultural College and in an official position I am even more unable to transgress the law by having foul brood colonies in my possession. In fact, I did attempt it, and I was promptly brought to time, and was ordered to burn all my colonies at once. I have been handicapped in that way; otherwise I would have done far more. I want to be able to experiment with infected bees and follow up certain lines of work which I have been unable to do in this Province. I had hopes of going to Quebec sometime to do it. I was able to do a little of it when I was away last year, and you will also see those results as given.

Mr. GEMMELL: I would like to ask Prof. Harrison if he thinks there is really any danger of infection by the bees visiting flowers?

Prof. HARRISON: I cannot actually give you any experiment on it. I have tried it. I have walked bees across cultures containing spores, and then have made them walk across sterilized food material and have had baccilli develop from those places, and I think from that fact that they can drop these germs. As we know, flies very often cause a very large number of diseases and other infections, for instance, in cheese factories from walking over curds, dropping in the milk and so on. We often have had trouble, and have had things to analyze which we know have come simply from that cause. As to this disease, when the bees visit a flower there is nearly always some sticky substance on top of the flower that may cause those germs to be held in place; they are so light, probably sixteen or seventeen millions of them would be required to make about a twenty-eighth of a gramme, which is a very small amount indeed. I did not put any emphasis upon my statement, I simply pointed out that it might be so.

Mr. HERSHISER: I would like to ask Prof. Harrison if he has obtained any knowledge as to how long the spores of foul brood will live or stay in that condition from which they may become active afterwards? For instance, if foul brood has been prevalent in a locality, and it has been stamped out for say twenty years, is it likely to break out from any spores existing in that locality in old bee trees? I know of a locality in New York State where foul brood some twenty-five or thirty years ago killed all the bees, and I have some bees from that locality, and a year or two ago I thought I had a colony of foul brood, which fortunately turned out not to be so, but it gave rise to that question in my mind.

Prof. HARRISON : In answer to that question I may say that I have an experiment going on at this time which has been in progress four years, and which I cannot say at present when it will finish. If I live eighteen years longer I may be able to tell you if they will or will not live that length of time. The experiment is as follows : Four years ago I spread some spores on a large number of small pieces of glass, and every three or four or six months I take one of these pieces of glass from the places where I keep them —I have them in two places ; in darkness in the ordinary drawer of a table in my laboratory, and in a cupboard where there is a little light, just about the same amount that would enter a hive—I take these out from time to time and make cultures therefrom to see if these spores are alive. When I last examined them they were still living. They are four years old ; they have been lying in this way without any food, perfectly dry, for the last four years, and we can probably say they will live through the same length of time as anthrax spores, which are known to live ten years without food at all. I hope after a time not only to try these again to see if they are still capable of growing, but also to see if they are still capable of producing disease. Therefore I cannot now answer your question more definitely.

Mr. MCEVOY : I can answer that question in part. No. The reason is that there have been no bees to defend it, and the tree has been exposed to other bees in the neighborhood, and they would come and rob or clean the honey all out of it, and there would be, therefore, no honey containing foul brood for the bees to go back to get.

Mr. HERSHISER : Supposing a colony of bees goes into a neglected tree ?

Mr. HALL : Have you got any bee moth in your vicinity ?

Mr. HERSHISER : Lots of them.

Mr. MCEVOY : Now you have got the answer. Allow me to thank our bee king, Mr. Hall, for helping me out.

ELECTION OF OFFICERS.

The election of officers then took place, and resulted as given on page 3.

WOODSTOCK FOR NEXT MEETING PLACE.

Mr. NEWTON moved, seconded by Mr. MCEVOY, that the next annual meeting of the Ontario Bee-keepers Association be held at the town of Woodstock, Ont., which, on a vote having been taken, was declared carried.

PREMIUM.

Mr. MCEVOY moved, seconded by Mr. DARLING, that the *Canadian Bee Journal* be recommended to the Board of Directors as the premium for the coming year, which, on a vote having been taken, was declared carried.

HOW LITTLE NEGLECTS AFFECT THE PROFIT OF THE APIARY.

BY W. Z. HUTCHINSON, FLINT, MICH.

For want of a nail the shoe was lost ;
For want of a shoe the horse was lost ;
For want of a horse the rider was lost ;
Being overtaken by the enemy and slain ;
And all for want of a horseshoe nail.

How well this old ditty illustrates the losses that occur in the apiary from little neglects. For want of a pound of feed in the spring the colony may be lost ; and for want of the colony the harvest is lost, as there are no bees to gather it. For want of

care in disposing of the cage and accompanying bees when a queen is bought, foul brood may be introduced into the apiary, and the end thereof no one knows.

Most emphatically is bee-keeping a business of details. Of course there are certain broad principles that must be observed before success can even be hoped for. The apiary must be located where there are honey producing plants, and there must be bees in sufficient quantity to gather the nectar. The bee-keeper must understand his locality; know when to expect the harvest, and have everything in readiness for it. If in a northern climate the bees must be protected in the winter, either by some kind of packing, or by putting them in a cellar. If comb honey is to be produced, some system must be adopted that will keep the working force together instead of having it divided up into two or three colonies. But after a man has mastered all the basic principles of bee-keeping, yes, after he has become conversant with the details, he may lose a large share of his profits simply from out and out neglect. The bees are in the cellar. He does not go near them. He does not know what the temperature is. It may be too low; and, if so, it might be possible to add to the protection afforded by the walls. Boards might be set up around the walls, held in place by strips of wood tacked to the sides of the house and the space filled with sawdust. This little care alone might, in some instances secure the safe wintering of bees that would otherwise perish or come through the winter in poor condition. If the bees are in the cellar under the home of the bee-keeper he might employ artificial heat at those times when it is needed. A large oil stove having a hood over it, connected by means of a pipe with the stove pipe in the room above, will answer every purpose. A cellar may become infested with rats or mice that will gnaw combs and do much damage if not got rid of. Equal parts of flour, sugar and arsenic placed in dishes in the cellar will make quick work with the rodents. Mice will play sad havoc with colonies left out of doors if the entrances are neglected. The bee-keeper should *know* how his bees are wintering. He should not neglect them. A perfect wintering of the apiary lays the foundation for a successful season.

After the bees are placed upon their summer-stands do not neglect them. As soon as the conditions are favorably look them over. Here and there will be a queenless colony. Here and there will be a weak one. United such colonies may prove as good as there are in the apiary. Neglected, they will be of little value—the queenless ones will certainly perish, perhaps become a prey to robbers; thus stirring up bad blood in the apairy at the time of the year when all should be peace and happiness. Some colonies will be found with a great abundance of stores, others on the verge of starvation. Neglect here means the loss of all colonies that are short of stores.

As the harvest comes on, do not neglect to have the hives, sections, frames, etc., all in readiness. Some of you may be ready to shout "Chestnuts." Well, if only those shout who have never been caught, I think none of us will need to cover up our ears. Nothing will quicker change the mood, and disposition, and intention of a colony, cause it to turn its energies into a different channel, than the neglect to furnish it surplus room when it is needed. The disposition to store honey is laid aside for that of swarming. A colony with the swarming fever will do little work until that fever is abated. If a colony first turns its energies in the direction of storing up surplus, it will often continue on in this way the entire season with no thoughts of swarming. And, speaking of swarming, reminds me, that the neglect to clip off just one little eighth of an inch from her majesty's wing sometimes results in the bee-keeper striking a dejected attitude, as he gazes sorrowfully over the tree tops where he sees disappearing as little specks in the sky, the last few, straggling members of the rear guard of a prime swarm that would have stored 50, perhaps 75 pounds, of honey for its owner had he not neglected to clip that little one eighth of an inch.

When it comes to the extracting of honey there is one point that I wish to mention, although it may be more a mistake than a case of neglect: it is that of extracting the honey before it is ripe. Of course, it is possible to artificially evaporate thin honey, but with this evaporation goes a portion of the fine aroma. Not only this, but the evaporation of honey does not *ripen* it. The bees in their handling of the nectar invert or change the cane sugar to grape sugar. They change the raw nectar into ripened honey. If we take it away from them before this change is completed, it lacks that much of perfect ripeness. It lacks the tang that tickles our palates. Thin, unripe, watery honey ferments, and sours, and bursts tin cans and barrels, and disgusts and disappoints every

one who has anything to do with it. Nothing has done more to destroy the market for honey than the placing upon it of unripe honey.

Little neglects in preparing the honey for market are very expensive. The neglect to scrape the propolis from the sections, the neglect to use non-drip cases, the neglect to put the cases into a larger case or crate when small shipments are made, may mean the loss of two or three cents a pound. Sections daubed with propolis, honey dripping from one case and daubing the one below it, coal dust and cinders rubbed upon the daubed case, greatly lower the price and retard sales. Before the days of no-drip cases and outside crates I went so far as to wrap a paper around each case before shipment, that the cases might be clean when they reached their destination.

Men who make exhibits at fairs often lose premiums that they might have captured had they not neglected to tastefully label their packages. It is a little thing, but it adds the finishing touch.

Then there are little things like: "Where do you keep your smoker and smoker fuel?" The neglect to provide a proper place for them may mean a costly fire. I once kept my smoker and fuel in an old wash-boiler. Once upon a time, when I removed the cover, the flames burst out. Suppose the boiler had been a wooden box kept in a building, and the fire had not been discovered while still confined to the box? I now keep my smoker and fuel in a large box, with a hinged cover, out in the yard.

The matter of saving wax ought not to be neglected. It is a good deal like saving paper rags, but it is just about as easy to save the odds and ends as to throw them away. A solar wax extractor is a nice thing for this purpose. Keep it standing in the yard, and when there is a bit of waste comb toss it into the extractor. One year when I did a large job of transferring I threw all of the odds and ends into a barrel, and pounded them down hard with the end of a large stick. Then the matter of rendering was *neglected* until that barrel two-thirds full of pounded down comb was one mass of webs and wriggling worms.

But why multiply examples? We all know that the profits of an apiary can be entirely wasted or destroyed by little neglects. What is the cause of this neglect? In some cases it is simply a combination of indolence, procrastination, and a sort of belief that things will come out all right of themselves. Then there is the neglect that comes from having too many irons in the fire. If you have so much business that you can only half attend to it, and something must be neglected, two courses are open: hire some one to help you, or else dispose of part of your business. There is more pleasure and more profit in a small business well managed than in a large business that must be neglected. Some men are so constituted that they cannot employ help to advantage. They have done all of their work so long that they feel no one else can do it properly. It would put them all in fidgets to see some one else cleaning their sections, or uncapping combs for the extractor. Other men have learned that it is much more profitable for them to oversee and plan the work, leaving the carrying out of the details to competent help. You know yourself, or ought to; so choose the course to which you are best adapted, but don't keep on conducting your business in such a manner that you are compelled to neglect it. Be thorough, up-to-date, progressive, and energetic, but do not lose half your profits as the result of little neglects.

Mr. HALL: These little neglects have covered a lot of ground, and I must speak in praise of the address read by our friend Hutchinson. I find as a specialist that my business with the exception of selling honey is all made up of little things. The man or woman who cannot attend to little things has no business to keep bees. A man may be able to equip and run a railway, and yet may not be able to run an apiary, because he cannot condescend to attend to the little things, he must have large things to attend to. I think that the cause of my success as an apiarist is that I can attend to a thousand little things, which is not saying that I can attend to a large thing at all. The phrenologist says this is my forte. He says, "You can attend to a thousand things and do them right, but you cannot boss a lot of men. A man who employed you would give you half his income rather than let you go, simply because you attend to the little things and do them rightly." I have often had young men with me to learn bee-keeping, and some of them cannot do the little things; they want to do a lot at once. They want to do a big day's work and rejoice at the end of it no matter how it is done. They cannot watch for the little things; they cannot cut the grass; they cannot tell me which

of the stocks of bees in the yard wants a super, and which is likely to swarm to-day except they open it. There are a lot of little things like that and I think it is want of observation. Bee-keeping, except in selling the honey crop, is all made up of little things. As far as spring feeding is concerned, I am a lazy man, and I have found it is better to give the spring feed in the month of September previous. As I have advocated in the past, never open your colonies of bees until the fruit blossoms, unless there is something wrong with them. If you want to know their strength, and cannot tell by the noise they make, tip up the hive and look underneath, do not break your quilts. This makes the difference of a crop of honey or no honey. You open them in the spring to see if they are queenless; what good can you do if they are queenless? Let them be. As to locality, Mr. Hutchinson is right. I think we do not as bee-keepers study our locality enough. I was reckoning up the other evening with my good wife how many men we could remember that had started to keep bees in the town of Woodstock and had totally failed, and we counted thirty-four, some of them with two hundred stocks of bees. They had not only failed but had lost everything. They saw that one little fellow was making his living at it, and they said, if he can do it we can. They lost their bees, and while they were losing their honey they lost their money. There are some who do not produce much honey and do not progress in the multiplying of their bees. They do not study locality, and as a result their business is spoiled for themselves and other people. As to wintering bees, I think that also should be done in September, and not in the months of December, January and February, for they will attend to themselves in mid-winter if you will attend to them in September. Give them all a good feed and let them alone. What the wintering of bees, I think, depends on—and I am pretty sure I think right—is the quantity of stores more than the position they are wintered in. I have wintered them with no top and bottom, and I have wintered them shut down pretty close and in cold, in warm, and in dry cellars, and I find those that have nice feed come out in good condition as a usual thing. There are some of them will die for want of the old queen or no queen. There is one little thing in which I differ from my friend who read that beautiful paper. He recommended us, no doubt conscientiously, to unite our queenless and weak stocks in the spring. This I have found from practical experience to be a waste of valuable time. It is all very well to do it as an amusement, but for profit never unite two or three or ten weak stocks. See that they have enough honey, and keep them shut down and give them a good letting alone and they will be sure to pull through. If you have ten and put nine together there is only one queen left, and that may be the poorest queen of the lot. You have not only lost four or five but you have destroyed all the good queens and very likely got a poor queen left, and you have got nothing but your queen. Do not unite in the spring. Let them pull through if they can. If they do not, you have got the hive for something better when the swarming season comes. That is my experience after twenty-five years. I used to unite them, and when we put them together they made a very good looking stock of bees, both in honey and bees, but in three weeks from that I had only one stock of weak bees, and therefore I thought my time was wasted. You know as well as I do that those bees are old, and they will live a few weeks only, and they do not pay for the labor of uniting them with a colony that has a queen. You may lose your best queen by that uniting, and if you do not lose that queen, those bees are old, and are going to pass from the stage of action in a very short time. I do not advise any of my friends to do it. There is one good piece of advice which he gives us, and that is to have a good "ready," and without a good "ready" you cannot do much. One year I had two boys and a man and myself, and we had a good "ready." We stayed there throwing chaff at each other all day long, and we got no honey. They laughed at me. I had 400 supers made to take comb honey, and we did not get an ounce of it. The next year we had them ready, and we got twenty-five thousand pounds of it, with less help We had a good "ready." Get ready whether you want to be ready or not. As to the extracting of honey, I copied from our friend Pettit who used to attend our meetings. I thought he was mistaken first, that is never to extract a full super. Do not let it go until it is full. Go and take out what are full and ripe, shoving the others to one side. Smoke them and pick them out and set them around while you are putting in new combs, and shut down the hive. These are standing there and you can then shake the bees off, and brush them up and there is no stinging. You can get on as fast as you like with no stinging if you just set them by for awhile.

Mr. Dickenson uses two supers. That is very nice ; but you have to lift one of them so high. But by going over them occasionally you can get just as much honey and just as good honey, and you do not give the bees too much room at a time. You know as well as I do bees do not like too much room at a time If you give them a little room they will say, " We want to fill this." With reference to a man in the apiary, you must have the right sort of man. Generally speaking we cannot lay our hands on a good man in our busy season, and we leave honey in the out apiaries to be extracted till the end of the season, which is very troublesome, and the honey is not so good. There is some of it that is not capped over when the cool nights come and it gets a little thinner. If you take it when it is coming in you do not get hardly any of it thin ; you keep the aroma there and you get just as much. Mr. Hutchinson also gives us as a pointer that we must be very particular in the packing and shipping of our goods. That thing in the long run pays better than anything I know of. If our customers get our honey in bad condition they are a little doubtful about dealing with us again, although they may not scold us or grumble ; whereas, if a man receives your honey two or three times, and sends in his order without asking the price, and says, " We always get your honey in good condition, ship us so much," we can know that he is satisfied. I find in shipping, especially where you have to ship long distances, that you can ship comb honey without any difficulty. With regard to saving scraps, we can save several dollars in the apiary by not setting it around so that it will draw the moths, and by attending to the bees properly at the right time. I say in bee keeping, as in anything else, the specialist is the man in the long run that is going to make money if there is any in it. You have your eggs all in one basket, and if that basket fall you have lost the lot, but if you have them all in one basket you can look after the basket. If you have several irons in the fire you are sure to get some of them burned. I have done nothing for a living for the past eighteen years but produce honey, and I have always received a living. Some years I have not received a cent, but I have been putting a little to one side all the time. It is simply because I do not give my attention to other things. I have not a good location. We have neighbors who do not get anything from it simply because they have got something of more importance to do—something larger. The bees are a side issue, and therefore they neglect them. In shipping comb honey we pack them up, a dozen small crates in a large crate ; we put straw in the bottom and then it is pressed down, and it goes down to about four inches. It is a slatted crate, so they can see what they are handling, and there are handles at each end and two men can pick it up. They see it is frail ; it doesn't look strong, and they handle it gently. We send honey in that way to Manitoba and British Columbia. The outside crate is about three-eights of an inch.

Mr. HERSHISER : I have saved some very valuable queens sometimes when they would be so near gone that there would be only a queen and half a dozen bees left. I have found them in that condition, and by exchanging this hive with the queen and a very few bees with another strong colony when they were gathering pollen, I have saved both.

Mr. HALL : If there is a very valuable queen there is something radically wrong, or else what you state would not be the case.

Mr. HERSHISER : Sometimes bees will drop down into the bottom of the hive and they are prevented from flying and are kept in there so that they worry themselves to death.

Mr. HALL : Certainly, but that is your fault. Your valuable queen that you speak of is not going to give you any service that year.

Mr. HERSHISER : One of these valuable queens that I saved in that way last spring was one that was advertised by Mr. Hutchinson, and I did not want to lose her. He sent her to me and the colony built up very strong and seemed to be in excellent condition to winter ; but that accident happened them, and I saved the queen, and I think I got fully forty or fifty pounds of honey.

Mr. HALL : Fall honey ?

Mr. HERSHISER : Yes.

Mr. HALL : That is an exceptional case. Where you have a lot of weak colonies you are sure to have some good queens and if you have good queens they will come up and make something and if there is a fall flow they will give you some fall honey. But, as I said before, by uniting them you may entirely spoil your good queen.

Mr. HERSHISER: You mean the ones in the strong colony?

Mr. HALL: I mean the ones in the strong colony may destroy the queen you have in the weak one.

Mr. MCKNIGHT: I have had some experience in shipping comb honey. My first experience was nearly fifteen years ago, when we went over to England with forty tons of honey as an exhibit from Ontario to the Colonial Exposition. Some of us were under the impression that comb honey would pack better than extracted honey. We discovered afterwards it would not. I had not very much comb honey myself and my old friend Mr. Pettit told me that Mr. Alpaugh had a nice collection of comb honey that he would send. I left Toronto and went up to Mr. Alpaugh's home, and I bought two thousand pounds of comb honey from him to supplement our exhibit. I knew Mr. Alpaugh's apiarian experience, and I knew he was a reliable man, and I instructed him how to pack it. I confess it was an experiment, because most of the rest of the comb honey was being packed in all kinds of packing apparatus. I told Mr. Alpaugh to put up his honey in twelve section cases, and to get outer cases made that would hold six of these nicely and closely and put no packing whatever. I told him I would take the risk, for I was buying the two thousand pounds on my own responsibility. That honey went to London in England and out of two thousand pounds there were not three spoiled sections when it reached its destination.

Mr. HALL: You were in company with that.

Mr. MCKNIGHT: Not always. He packed it at his home in St. Thomas, it was sent down to Toronto; nobody saw it from St. Thomas to Toronto. Mr. Couse and I were there. We did not open the cases, but we shipped them from there to Montreal. We did not follow it to Montreal. Mr. Torrance, the manager of the Dominion Line gave us the assurance that he would see that our goods were properly handled and trans-shipped from the train to the boat, and we took his assurance and left it to him. I had the honor of setting up with my own hands perhaps the largest exhibit of honey that has ever been set up in the world, forty tons of Canadian honey. If your comb honey is in proper shape there is not much danger except in frosty weather, when the wax becomes brittle. Something was said as to shipping honey to the North-west. I may say that I have sold nearly all the comb honey I have ever produced up there, and shipped it there but I took another plan of sending it. I took three of these dozen cases, one on top of the other, and I put strips of common lath up the corners and made a kind of a band of lath around each end and that was all I did. At first I used screw nails; I thought it was necessary to fasten these laths very securely to these sections; I discarded the screw nails after a while as being kind of tedious and used common small wire nails, and in all the comb honey I ever shipped to the North-west I have never had a single complaint as to a broken section or a spoiled comb.

AN EXHIBIT AT THE PAN-AMERICAN EXPOSITION.

At this stage Mr. Herschiser gave the members, at the request of the President, some further information as to the Pan-American Exposition to be held in Buffalo during next year, after which Mr. HALL moved, seconded by Mr. BROWN, that the Executive be a committee to confer with the proper authorities and if arrangements can be made that there be an exhibit of honey made at the Pan-American Exposition in 1901.—Carried.

BEE-KEEPERS I HAVE MET, AND APIARIES I HAVE VISITED.

On Wednesday evening Mr. ERNEST R. ROOT, Editor of "*Gleanings in Bee Culture*," Medina, Ohio, gave every interesting stereoptican entertainment and explanatory address on "Bee-keepers I have met and Apiaries I have Visited," which was very highly appreciated by all present.

This part of the entertainment having been concluded, the members retired to the Hotel Savoy where an excellent dinner was served, after which the balance of the evening was taken up with toasts, speeches, songs, and recitations, and it was the unanimous opinion of all that an enjoyable evening had been spent.

EXPERIMENTS IN WINTERING BEES.

By John Fixter, Central Experimental Farm, Ottawa.

The following eight experiments have been tried : Four were tried in the cellar, one in a pit dug in a hill side, one in a root-house, one in the house apiary, also outside wintering. The cellar is below a private house. The walls are of stone and the floor cement. The bee room is 12 feet wide by 15 feet long and 7 feet high ; this allows three tiers of shelves and two passages. It is boarded off from the remainder of the cellar by a partition, which extends all around the chamber and far enough from the stone wall to allow of a small air space. Under the cement floor a layer of small stones. 12 inches thick, acts as a drain and keeps the cellar perfectly dry. There is also a tile drain which runs through the wall on the lowest side. Any water near by will readily find its way to the drain. The first shelf is 18 inches from the floor, the second 20 inches in the clear above, and the third twenty inches above that. Neither the hives on the third shelf, nor the uprights supporting the shelves, nor any part of the partition touch the ceiling, so that no vibration can disturb the bees from the upper part of the house. The bee chamber is thoroughly ventilated, as is also the whole cellar. There is a three-inch pipe passing through the bee chamber up to a stove pipe provided with a damper, with which to regulate the draught. There is also a six-inch pipe passing through the floor to the chimney that ventilates the balance of the cellar. Before entering the bee room is a smaller room, with a door leading outside and another leading to the bee room ; both rooms are provided with sliding ventilators in the doors, so that outside air may be let in at will. Ventilation is carefully attended to, and sudden draughts or changes of temperature are avoided. For this a thermometer, which is always kept in the cellar is watched. The best temperature for the bee cellar is found to be from 42° to 48° Farenheit. This arrangement has given entire satisfaction. In former years there was not proper ventilation, and the cellar was always damp. Since the concrete floor has been laid, and the ventilators put in, the cellar has been much drier and cleaner. It is also rat and mouse proof, which is a very great advantage. The difference in the comsumption of honey by the bees is marked since the cellar was improved. The coal stove, which was formerly in the smaller room to keep a uniform temperature and to keep the cellar dry, has been abandoned, as the cellar and hives can be managed so as not to require it. I would not recommend anyone to use artificial heat.

Experiment No. 1.—Eight colonies in eight-framed Langstroth hives were put into winter quarters in the cellar and placed on the shelves. Under the back end of each hive was placed a three-inch block, by which means the back of each hive was raised so as to insure free ventilation. Each hive was, besides, raised from its own bottom board by a small three-eighths of an inch block placed at the back. All front entrances were left wide open, the wooden covers all removed and replaced with cushions made of chaff, four inches thick, and wide and long enough to lap over the hive two inches. Temperature of the cellar was taken once each week all through the winter, and was as follows : November, 46° to 47° ; December, 47° to 48° ; January, 44° to 46°, February, 46° to 50° ; March, 48° steady. The bees were quiet, only a very slight hum being noticeable up to February, when, the temperature having risen to 50, the bees began to get uneasy, and make considerable hum. Cold air was carefully let in during the night by opening the slides in the doors and closing them in the morning ; this lowered the temperature, and the bees quieted down. During the past winter every colony in this experiment was perfectly dry and clean, and all came out in excellent condition. Average honey consumed or loss in weight for the past six years, 11 pounds, ½ oz.

Experiment No. 2.—Two colonies were put into the cellar on 12th November, with tops and bottoms of the hives left on, just as they were brought in from the bee-yard. They were watched for dampness, and to compare the amount of honey consumed. The temperature of cellar was the same as No 1. During December and January both hives made considerable hum. 27th December, drops of water were noticed all along the entrance of both hives. This same trouble continued until March ; on 30th March both hives were removed to their summer stands ; one had spots of faeces on the entrances. Both hives were damp and the combs were slightly mouldy, but there were very few dead

bees in either hive. The average loss in weight for the past six years has been 13 pounds 1¼ oz.

Experiment No. 3.—Wintering in a root house. The hives were placed on a shelf nailed up against the wall, about three feet from the ceiling and projecting two feet. A curtain was hung from the wall over the top and down in front of the hives, so as to keep out all light. The wooden covers were removed and replaced with a chaff cushion. A strip of wood 2 x 2 inches was placed all along both sides between the brood chamber and the bottom board, so as to give more ventilation at the bottom, and both back and front were left wide open. In former years the hives kept in the root house did not appear to have ventilation enough ; this extra space has proved very satisfactory. Temperature was taken every Monday of each week and was as follows : November, highest temperature, 38°, lowest 36° ; both hives quite dry but very noisy. December, highest 42°, lowest 36° ; mice had found their way into both hives and disturbed the bees. Some strips of tin put around prevented them getting in again. January, highest temperature 41°, lowest 39°. February, highest 39°, lowest 38° ; by the end of February both hives had got perfectly dry and fairly quiet. March, highest temperature 40°, lowest 36°. During March both colonies had got very noisy, and showed signs of dysentery, dampness and mould, but were strong in numbers. Considering the amount of disturbance the bees are subject to in this experiment, I would say that they came out well. Once or twice each week the large doors of the root-house were thrown wide open to allow the teams in to draw the roots out, and this let in much cold air which came in suddenly upon the hives. The teams, also, drawing over the floor, jarred them very much. The amount of honey consumed on an average for the past four years was 14 pounds 3 oz. each.

Experiment No. 4. Wintering in a pit dug in a dry hill side. The pit was 3 feet deep, 3 feet wide and 10 feet long in such a way that the ventilators at both ends might not be immediately above the hives, which were in the middle of the pit. The hives rested on two cedar poles laid along the full length of the pit The ventilators, which were 3x4 inches, were made of boards, three of which reached down to the bottom of the pit, and the fourth only to the top of the pit. The ventilators rose 3 feet above the ground, wooden covers removed and replaced by chaff cushions. In each hive 2x2 inch strips of wood were laid under both sides and under the back end between the brood chamber and the bottom boards, so as to provide more space for freer ventilation at the bottom of the hive. The pit was covered with cedar poles laid along its length, the middle ones higher than the others, and these covered with a layer of straw and one foot of earth. A small shaft was so arranged between the hives, down which a thermometer could be lowered by means of a string, so that the temperature of the pit could be ascertained. Temperature was taken once each week. From November to March the temperature did not go below 38 nor above 39. On 26th March the pit was opened, both colonies came out good and strong, but the combs were badly moulded. Average weight consumed during the past four years was 11 pounds 4¼ oz. Great care should be taken to guard against water reaching the pit.

Experiment No. 5. Wintering in a house apiary. The house apiary faces the south, the walls are double boarded, with an air space of four inches. The floor, which is about one foot from the ground, is also double boarded and there is no draught under it. The hives were moved one foot from the wall, and placed on a double thickness of sacks laid on the floor ; the wooden covers were removed and replaced by chaff cushions. In addition to this, the hives were covered above and all around with a double thickness of sacking. Also one foot of cut straw was put below and all around. A small shaft 1½ inch square extended from the opening of each hive to the outside of the building ; 2 inch strips of wood were placed under both sides and under the back, between the bottom board and the brood chamber, so as to give more space at the bottom of the hive in case a quantity of dead bees should accumulate. No flying took place from 12th November until 7th March when several bees flew out. From March 8th to 26th they flew 9 days but were very weak. Another examination was made April 21st. Both colonies had deserted. The combs were quite dry and clean, and there was plenty of sealed honey in the hives. An average amount of honey consumed during the past five years, 15 pounds, 15 oz.

Experiment No. 6 —Two colonies were put into the cellar with bottoms of the hives left on, just as they were brought in from the bee yard. The wooden covers were remov-

ed and nothing left on except a tightly sealed propolis quilt ; the entrance was left wide open. During the entire winter the bees kept perfectly dry, and a very slight hum could be heard. Both hives came out in excellent condition. An average amount of honey consumed during the past four years, 11 pounds, 7½ oz.

Experiment No. 7.—Two colonies were put in the cellar and placed on the shelves, a three inch block being placed between the bottom board and brood chamber only in front making the full entrance three inches high across the whole front. The wooden covers were removed and replaced with a chaff cushion. Temperature same as No. 1. During the whole winter both colonies in this experiment were perfectly dry and clean, and showed no uneasiness of any kind. They came out in the spring in excellent condition. The average amount of honey consumed during the past four years, 10 pounds, 8¾ oz.

Experiment No. 8.—Wintering on summer stands. Two colonies were left on their summer stands with extra packing around the sides and top. A box one foot larger each way was placed over the hive and filled with cut straw. The wooden cover was removed and replaced with a chaff cushion. A small shaft one and a half inches square extended from the opening of each hive to the outside of the box. No flying took place from 12th November until 7th March, when a slight hum was perceptible and a few bees made their appearance. On 15th April the hives were taken out of the packing and found to be deserted. Many dead bees lay at the back end of each hive. The frames were all dry and clean, and had abundance of sealed stores. Average loss of weight including honey and dead bees during the past six years, 19 pounds, 1½ oz. Only two seasons out of the six the bees came out in good condition. From experience gained I would recommend wintering in the cellar in any section where the temperature goes over 15 below zero.

Average loss in weight of honey and bees :

No. 1.....	11	pounds,	½ oz.....	wintered in	cellar.
No. 2.....	13	"	1¼ oz.....	"	cellar.
No. 3.....	14	"	3 oz.....	"	root house.
No. 4.....	11	"	4¼ oz.....	"	pit in hillside.
No. 5.....	15	"	15 oz.....	"	house apiary.
No. 6.....	11	"	7½ oz.....	"	cellar.
No. 7.....	10	"	8¾ oz.....	"	cellar.
No. 8.....	19	"	1½ oz.....	"	on summer stands.

Mr. DARLING : As to experiment No. 6, where did you winter your hive ?

Mr. FIXTER : In the same cellar as No. 1.

Mr. POST : Referring to experiment No. 7, what distance was this from the cellar bottom ?

Mr. FIXTER : I generally carry on my experiments on the second shelf. The first is eighteen inches and the second twenty above that ; that would be thirty-eight inches from the floor.

Mr. DARLING : Before the matter is discussed I would like to suggest that there is one other experiment that might have been tried if Mr. Fixter had had the time : that is, to either leave the top board on, or leave a propolized sheet under the cushion, and raise it up at the bottom and note whether there would be any difference By taking the cushion off and putting the board on you allow the moisture to get away.

Mr. FIXTER : I have tried that but I didn't keep track of the amount consumed.

Mr. DARLING : What about the condition of the colony ?

Mr. FIXTER : It came out very good. What I tried it for was to see how much heat there was between the cushion and the hive.

Mr. DARLING : I failed to find any particular difference in the honey consumption.

Mr. SMITH : You said in the last experiment it was single packed, and also that the consumption of the stores was very much greater than in the other experiments. Have you ever tried them packed in four so that they have the benefit of heat from each other ?

Mr. FIXTER : No.

Mr. SMITH : We have never conducted any experiments, but I think you will not lose so much with four.

Mr. FIXTER : In changeable weather I think it is harder on the bee. They must consume more honey to keep up that heat. I have come to the conclusion that it does not pay any person to winter outside where the temperature will go down to ten below

zero. So far as packing is concerned, one man can carry ten hives into the cellar in the time it would take him to pack one. The great fault had been that have been leaving our bees in the cellar too long in the spring. We are trying them every year a little earlier—about a week earlier. Last year I set out those in the out apiary, those in the closed apiary and those in the house apiary, and in the out apiary we had a foot to a foot and a half of snow to scrape away to get the hives down to the ground. I covered them over to protect them to a certain extent; and I find as soon as we take them out they start to breed up, and by the time the honey flow comes on they are in excellent condition.

Mr. SMITH: Of course that is all very nice where you have the bees at home, but when you have out apiaries cellars are not always convenient. We have to use the next best thing. You will find if they are packed in four that any time during the season if you put your hand down in the corner of those four there is quite a warmth, and the bees cluster to what side and they do not consume nearly so much stores.

Mr. FIXTER: Taking all things into consideration I think it would pay well to build a cellar.

Mr. HALL: I want to suggest to Mr. Fixter that in answering Mr. Smith he has just given us the reason why those outside consume more honey. As soon as you get your bees out in the spring they begin to brood. I once put out twenty stocks in the Hedden hive, on the 1st March, and it went down 10 below zero, and I said to myself, "You ought to be kicked." Allow me to tell you that those twenty hives, with one exception, when the honey flow came, were about two weeks ahead of all the rest put together.

Mr. POST: As these experiments were all conducted about forty inches from the cellar bottom floor it would have been very interesting to have had two hives prepared, one quite close to the bottom of the cellar and another one higher. There are not many of us to begin with, that have the room to put our hives forty inches from the cellar bottom. I have to begin close to the floor. I commence by putting a cushion under the first one. There is a trouble with combs becoming mouldy at the bottom, and the reason of that is that if there is any current of air circulating the cold air will circulate near the floor of the cellar, and it strikes the bottom of the hive, and it condenses the warm air in the hive and causes moisture. If the bottom of the hive has a cushion put underneath, and the hive is set close to the floor, I cannot see any difference between the top tier and the bottom.

Mr. HOLMES: I would like to ask Mr. Fixter with reference to the loss of bees in the first flight, in the experiment where he had to remove the snow.

Mr. FIXTER: You will have to watch the day when you set them out. If you can get a day where the temperature goes about 48 degrees or 50 degrees and calm there is very little loss, but if you happen to get caught and put them out and the wind comes up cool, then you will find quite a few dead bees on the snow. But I would take my chances and set them out early.

Mr. EVANS: I would like to suggest an experiment. Instead of putting a block under the hive just simply pull the hive back so that there will be a space of about two inches behind the bottom board. That is my system.

Mr. HALL: Mr. Evans is all right with this exception, that if you put a couple of hundred stocks in the cellar you are sure to have a larger or smaller quantity of bees die. Some are lazy. They do not take them out of the hive, but let them lie on the bottom board, and they accumulate, and they touch the combs and the combs become mouldy. If you raise them up that does not happen.

Mr. MILLER: I find an excellent way to avoid this trouble if a man is lazy, is to leave the bottom board in the yard; lift your hive directly from the bottom board, and carry it to your cellar. The idea of bees escaping is erroneous. I have found it very satisfactory both in carrying in in the fall and in placing out in the spring.

Mr. HALL: If Mr. Miller had a cushion in front he could not carry very many out except with a hand barrow.

Mr. MILLER: I carry them on my shoulder.

Mr. HEISE: The only experiment I am particularly interested in is the one where they are wintered outside. Mr. Fixter told us that the consumption of honey was somewhere in the neighborhood of six pounds greater than of those wintered in the cellar. Mr. Hall said those wintered outside commenced brooding earlier than those in the cellar. What is the difference, if any, and is it not in favor of the colony wintering out-

side, notwithstanding the consumption of honey? When the honey flow commences are they not in a better condition to take advantage of it?

Mr. PETTIT: In wintering outside with ventilation to the entrance are you successful in getting the dead bees all away from the entrance?

Mr. FIXTER: Yes, I have a long wire, and I do it as carefully as possible so as not to make the least sound.

Mr. SIBBALD: I have wintered in and out both, and I find, like Mr. Fixter, that it takes a good deal more stores to winter outside. Mr. Hall's idea may be all right, but I always fancy that the occasional flights they get through the winter, which are really unnecessary—because they will winter all right in the cellar without any flights—such flights cause a consumption of stores, and a wearing out of the vitality of the bee; and in consequence of that they have got to start to breed, to have a new generation to take the place of those that are going to be perhaps a month earlier than the ones that are placed in the cellar. That early brood of bees only takes the place of the ones that are worn out, and there is no gain, and they have got to consume just as much honey to raise other bees in the spring. As far as being ready for the honey crop is concerned, those wintered in the cellar always seem to me to have the bees ready for the harvest at the right time, whereas those outside were often very numerous a week or two weeks before the clover came in, when we had not anything for them really to do and had not hardly enough honey to keep them. I do not know whether I am right or not. Mr. Hall has had a great deal more experience than I, and I always hate to state anything that conflicts with him, he is an authority.

Mr. HALL: We winter both ways, two lots in the cellar and one outside. I prefer them in the cellar because it is the easiest way.

Mr. SIBBALD: I always weigh my hives before I pack them, and either have them up to a certain weight or feed them up to a certain weight, and then the next spring I find those outside in that out yard short of stores, and my cellar ones never run out of stores; they had an abundance right through, and I had to take combs from the home yard up to the other yards and put them in there, and I could not come to any other conclusion than that they used far more stores outside than in. As far as the condition is concerned I could not say there was very much difference. I am very much in favor of cellar wintering if you have a cellar. If you have out apiaries and can not get a cellar there is no other way I know of except pack them up. As far as blocking up goes, I have tried blocking up in front like Mr. Hall and Mr. Fixter, and I noticed a little moisture at the back end of the hive with that system, and one winter the mice got in the front and did a little damage. With the system of blocking them up three-eighths of an inch behind, a mouse cannot get in, and you are safe from them. At the apiaries where you cannot watch them very closely a mouse gets in and does a great deal of harm.

Mr. HALL: I do not defend either outside or inside winterings. I do both.

Mr. NOLAN: We have always wintered outside, and have had no experience of wintering in the cellar. We use chaff, sawdust, and all kinds of packing, but I cannot see any marked difference in favor of any of the different kinds of packing. We did at one time try wheat chaff, but whether there was any better result I could not say. I think Mr. Smith referred to packing more than one in a case. In our experience packing more than one has nothing of advantage. We find they winter better with us in single cases. When there is more than one put in, if one colony becomes uneasy from any cause whatever, you will usually find a colony on each side of that, or probably more, which will be attracted by that uneasiness and will be affected; whereas, if they are packed in single cases an uneasy colony will not affect any of the others.

Mr. SMITH: I have never found any trouble whatever. If one colony didn't winter as well as we liked it did not make any difference to the next one. We simply pack them in the same shape as they are in the summer. They are set in fours, two facing east and two facing west, and the cases are so made that the lumber can be cut up without any waste to make these boxes to hold four. It does not take many minutes to pack them, and we find they winter that way as well as any way I have tried. We used to have long cases when we lived in Muskoka.

Mr. MCEVOY: I have tried both ways, and I have found everything was in favor of the single cases, and I never put them in anything else. I approve of Mr. Nolan's way

of keeping them in single cases. The trouble when they were put together was that if it came a warm spell in January some young queen was apt to lay, and they broke the cluster more, and they got a little over-heated. They seemed to winter better in the single cases, and not to start brooding so early in the spring as they did when they were bunched together.

Mr. SHAVER: Do you find any difference in your bees going from one side around to the other on a nice day, Mr. Smith?

Mr. SMITH: No. We narrow up the entrance. We have an entrance of about five inches by three-eighth, and we narrow that up still more with a piece of card-board. We leave an entrance on the windward side of about an inch. If the colony wants more room they make the entrance to suit themselves.

Mr. DARLING: Mr. Fixter referred to the question of loss of bees by snow in case there was plenty of snow upon the ground. I am one of those fellows that do things I would not do if I could see a little way ahead. A year ago last spring I carried out quite a number of colonies on the 11th March and the balance I put out on the 26th. It was rather a fine spring, and for sometime I thought those taken out on the 11th were going to outstrip all of the others, but I found when it came to the honey flow that those were the worst we had. With regard to the bees flying out I think I would throw a little of that snow in front of the hive. Sometimes I put out bees in the evening and occasionally am a little late in doing so. I remember once in particular when I carried out some bees and set them out at night, for I was sure it was going to be fine the next day; and I think it was three days that it was not fit for bees to fly, and there were some that were carried out so late that they didn't get out that night, and they went in and stayed quiet until it was fine two or three days afterwards.

Mr. POST: That exactly agrees with my experience. I have a great many bees, and I am not very particular whether it is really fine for them to fly or not. I would rather have it so that they could fly well or else not at all. If they cannot fly at all then they will wait until there is a fine day.

Mr. ARMSTRONG: Did you ever try setting anything up in front of the hive to keep the wind from blowing in at the entrance?

Mr. FIXTER: Our apiary is particularly shaded, and the wind can scarcely get at them; there may sometimes be a little from the east, not very much. I have not done that. In the house apiary last winter I put a piece of brick a little distance out from the front of the entrance.

THE VALUE OF BEES IN FRUIT ORCHARDS.

By Dr. JAMES FLETCHER, Dominion Entomologist, Ottawa.

The subject on which I have been asked to speak to-day is one of considerable importance, although strange to say, it is one which is seldom spoken of at conventions of beekeepers or fruit growers, viz.:—"The Value of Bees in Fruit Orchards." Indeed, this may be due to the fact that this value is so well known, and generally acknowledged that some might think that the discussion of such a subject would be to use valuable time somewhat unprofitably. This, however, is not my opinion, and I was much pleased to avail myself of the opportunity when specially requested by the council of the Association to address you upon it to-day. Although the main facts are generally accepted, few have paid sufficient attention to the matter to be able to express a definite opinion, and fortify themselves with actual observations with which they could prove their position. In fact my address to-day will be an appeal to bee-keepers to know a little more about what is really a branch of their own business of no little importance at all times, but particularly at the present juncture.

The probable reason why the executive asked me to discuss this subject to-day, was the keen interest in the true relations existing between the bee-keeper and the fruit-grower, which has been recently evoked by two important actions at law. One of these the *Queen vs. Sparling* was only yesterday decided in favor of the latter, a bee-keeper in Canada; and the other *Utter vs. Utter*, which is even now before the courts of the United States. The significance of these cases is very great, for it is clear that if the verdicts in

these cases should be given against the bee-keepers, it will be a serious set back to the industry of honey raising in North America.

In the first of these cases it was claimed by a neighbor of Mr. Sparling, that by keeping bees he was a public nuisance, and several things were claimed to be true which all bee-keepers knew were very improbable, and which many claimed were utterly impossible. This, however, had to be proved to the court; and although the case was given in Mr. Sparling's favor, the action was taken in such a way that he was put to considerable expense. A rather more important test case is that of Utter Brothers, of Amity, in New York State. The suit was between two brothers living near to each other, one a bee-keeper, the other a fruit grower, who claimed $100 damages for injuries done to his peaches and peach trees by his brother's bees. This case has already been tried before a justice of the peace, who, notwithstanding that many impossible injuries were claimed to have been done by the bees, gave judgment for $25 and costs against the bee-keeper. The serious nature of allowing such a judgment to go unchallenged, was at once recognized by the National Bee-keepers' Association, and, owing to the most commendable generosity of the Hon. Eugene Secor and Messrs. A. T. and E. R. Root, all well known to bee-keepers, the necessary funds for appealing this case have been guaranteed. The case is, therefore, to be tried again in a higher court in a fortnight's time at Goshen, N.Y. Expert testimony will be taken from the leading bee-keepers and entomologists in the country, and if the same absurd claims are made at the coming trial as were put forth previously the verdict in this case must be reversed. Nevertheless, however this may be, it is perfectly evident that sufficient definite and exact knowledge as to the habits of bees was not forthcoming from bee-keepers at the first trial when it was required to convince the judge that the claims made were untrue and not founded on fact. This, I submit, should not be the case. It is the duty of every bee-keeper to observe closely and study the matter until he is able to answer the old question which has come up time and again; "Do, or can bees injure unbroken fruit, however ripe it may be?" I am not either a bee-keeper or a fruit grower, and had no preconceived opinion one way or the other when I began to study this question. During the last ten years I have read everything I have seen in which the matter was dealt with, and have made many observations of bees when visiting ripe fruit, and I must acknowledge that I believe it is impossible for honey bees to rupture or pierce the skin of any of our cultivated fruits, even when over-ripe and in any unfit condition for the market. This too, as far as I can learn from published reports, is also the opinion of the majority of the leading entomologists.

The claims which have occasionally been made that bees injure fruit with their claws or stings need not, I believe, be even discussed before this meeting of practical beekeepers gathered here to-day. With regard to the jaws of bees, when we examine their shape, position and softness, I feel sure that it is as impossible for them to use these for the rupturing of the tough skin of fruits as it is for them to do the same work with their soft flexible brush-like tongues.

A great deal of most excellent critical and scientific work is done by the practical bee-keeper every year, and I am surprised that more attention has not been devoted to this point by bee keepers. Let every member of the Association try next year to make some careful observation and report them at the next annual meeting.

I have said that I do not believe that bees can injure fruit, but I have no experiments of my own to back up this opinion. Fortunately, this is not necessary, for I can submit to you some careful and very conclusive experiments which were carried out some years ago at Aurora, Ill., under direction of the United States Department of Agriculture and are reported in the *Rural New Yorker*, of November 10th last by Prof. M V. Slingerland, of Cornell University, one of the very first practical entomologists in the United States. I will read to you some of the most striking paragraphs in this article; but it will be worth the while of every bee-keeper and fruit grower to get this number of the *Rural New Yorker* and read it carefully. In these experiments a house was built sixteen feet long by ten feet wide and eight feet high at the corners. The sides were partly covered with wire cloth; the house was quite bee-proof, and the temperature and light were practically the same as outside.

"Along the sides of the house were built shelves upon which fruit was placed so that the rays of the sun might strike the different varieties in different stages of ripeness from

green to dead ripe. Plates of ripe peaches, plums, pears, etc., were placed on the shelves; clusters of different kinds of grapes, green and ripe, sound and imperfect, and such as had been stung by insects were suspended from the rafters and cross-ties of the house.

"September 1st three colonies of bees were removed from their hives carefully and quickly, so that they would carry very little honey with them when transferred from one hive to another. Two of the colonies were hybrid bees, and one Italian. The colonies were hived on empty comb and placed in the house with the fruit. A wood stove was put in the house, and for a number of hours each day a high temperature was maintained. The physical conditions which would ordinarily prevail in nature during a protracted and severe drouth were artificially produced and steadily maintained. The bees were brought to the stages of hunger, thirst and starvation by these artifical conditions. Every inducement and opportunity was afforded the bees to satisfy their hunger and thirst by attacking the fruit exposed. They daily visited the fruit in great numbers and labored diligently to improve the only remaining source of subsistence. They inspected and took every advantage they could of every opening at the stem, crack in the skin or puncture made by insects. They regarded the skin of peaches, pears, plums and other fruits having a thick covering simply as subjects for inquiry and investigation, and not objects for attack. If the skin was broken or removed, they lapped up and sucked the juices exposed; but made no attempt to grasp the skin of grapes with their mandibles or their claws."

This experiment, with various modifications, was continued for thirty days, and then was repeated a second time for forty days and afterwards again for twenty-five days. "The bees showed no more capacity or disposition to offer violence to one variety of grapes than to another; no more attention was given to the thin-skinned varieties than to the thick skinned. As long as the skin remained whole, they did not harm the grapes. When the skins were broken by violence, the juices exposed were appropriated."

"At times when bees could gather nothing in the fields clusters of grapes were saturated with honey and suspended in front of hives in the apiary, other clusters dipped in honey and syrup were hung in the house. The bees thronged upon the grapes until the clusters looked like little swarms hanging to the vines and limbs. They lapped the grapes until the skins were polished perfectly smooth and shining, but the skins of all were left intact."

There is much more of interest in this experiment than it is advisable for me to read to you now; but you will find that it was a carefully planned and carried out exhaustive experiment, and the conclusion reached was that bees, not only did not, but could not injure fruit unless the skin was previously ruptured by wasps or some other insects, or by birds, etc.

With regard to the question of stinging fruit, Mr. Slingerland says: "Many erroneously suppose that bees sting the grapes, but they never sting except in self-defence or in defence of their homes."

In the cases referred to above it had been claimed that bees had been a nuisance by stinging pickers in fruit plantations, and by preventing horses from drinking at watering troughs. You are all aware that naturally bees do not sting if no quick aggressive motions were made to irritate them; but anyone can make the quietest bees sting by hitting at them. With reference to bees clustering around horse-troughs this could of course be prevented by providing plenty of clean water for the bees near to the hives, a practice which is always seen to by good bee-keepers who know the importance of it. The statement that bees had stung fruit, and that this had induced decay is so improbable that I cannot believe it. Of course I have not tried any actual experiment of making bees sting fruit; but I am quite postive they would not do so when at large in a state of nature, and as to causing decay of the tissues, judging from analogy the exact opposite to this is what might be expected: and instead of the fruit being injured it would be preserved. The poison injected through the sting of a bee is formic acid, identically the same poison as that of a wasp. One of the chief differences between bees and wasps is in the nature of their food. Bees feed upon pollen and nectar which they gather from flowers; wasps, on the other hand, although they are very fond of nectar and other sweets, feed their young upon animal food in the shape of other insects. The solitary wasps build their cells and provision them with the bodies of spiders, caterpillars, etc., which they have disabled by stinging them, not to death, as some think, but to a state of insensibility. The

remarkable fact has been discovered that the formic acid of the sting of wasps, ants and bees is chemically almost identical with chloroform. When a wasp has made a cell for her young she fills it with the bodies of insects which she had stung and paralyzed and which will remain in a torpid condition for several weeks. Before closing up the cell she lays an egg among these insects. When the grub hatches it is surrounded by a copious supply of fresh food, which is preserved from decay by the antiseptic properties of the formic acid. A common insect which may be watched by all is the large black ground wasp, *ammophila luctuosa*, which is a dire enemy of cutworms, hunting them and digging them out like a dog. As soon as one is detected by the wasp, either by smell or some other keen sense, she sets to work to burrow down and find it. I have seen one of these wasps dig down half an inch into sandy soil until its body was nearly out of sight and a heap of sand was thrown up behind it. As soon as the caterpillar is found she lays hold of it with her jaws, and backs out of the hole dragging her victim with her. Without any delay she mounts on its back and stabs it once or twice with her sting when, after a quiver or two, it at once becomes motionless. Then standing over it she holds it up to her body with her middle pair of legs and runs off with it if it is too large and heavy to fly with, to her nest, a hole in the ground, sometimes a long way distant, where it becomes the food of her young.

If, then, this is the effect of formic acid upon animal tissue we may, at any rate until we know the contrary, claim that it is likely to have a similar effect upon fruits, and must try as soon as possible to find out the true facts of the matter. It has been claimed by some that one use of the sting and poison of bees is to inject a small quantity of the latter into each cell of honey before it is sealed for the very purpose of preserving it from fermentation and decay. This is one of the points which we must try and get settled. It will, of course, be difficult; but I fancy that magician, the chemist, will be able to help us.

There is another phase of my subject to which I wish to direct your attention, namely, the inter-relation of plants and insects, and I hope that I may be able to lay before you facts which may be new to some of your members, facts which cannot but call forth admiration for the marvellous provisions to be seen everywhere in the world of nature for bringing about good and useful results, and preventing waste. It will be found that not only are flowers absolutely necessary to bees as a source of their food—nectar and pollen—but that insects are no less necessary to most flowers to secure their perpetuation. This fact above all others should be recognized by the fruit grower, for were it not for insects, and particularly the honey bee, his crops of fruit would be far less than they are every year, and even in some cases to be referred to later he would get no crops at all.

Flowers of plants are a special development of leaf growth produced for a special purpose, namely, for the maturing of seed, the chief means by which a species is preserved from extinction. A normal flower consists of two sets of organs, a protective envelope made up of the corolla, which, as a rule, has highly colored and showy petals, and the calyx, which is mainly a protection during the time the corolla and the more important organs contained inside it are developing. The other set of organs known as the essential organs comprise the stamens and pistils: the former of these represent the male sex and the latter the female. The anthers, the important part of the stamens, are practically small cases containing pollen, without the agency of which the ovules or undeveloped seeds, which are formed in the lower part of the pistil, cannot come to maturity; or, from the fruit growers' point of view, unless the flowers on his trees are fertilized in this way, no fruit will form, and his labor will be in vain

It is necessary, then, that pollen should be applied to the stigma or sensitive portion of the pistil before the seeds can be developed, and it has been found that it is most advantageous to a species that the seeds of a given flower shall be fertilized by the pollen from some other flower. A study of the devices provided by nature to ensure this cross-fertilization forms one of the most charming branches of the whole study of botany. It is a branch of the subject which may be said to have had its origin in the remarkable studies of the great naturalist Charles Darwin; therefore, is quite recent. But now that attention has been drawn to it, it can be seen to be a general principle running through all branches of the vegetable kingdom as well as of the animal kingdom. Although, as was pointed out by Darwin, some plants can be and are fertilized by their own pollen, it is

always of greater benefit to their descendants for flowers to be fertilized by pollen from other flowers of the same kind growing upon other plants. He summed up his observations with the trite axiom: "Nature abhors perpetual self-fertilization." Which was first enunciated in his great work published in 1862 on the fertilization of orchids. The publication of this classic work marks the beginning of one of the most important eras in the history of the science of botany. Since then endless observations have confirmed the accuracy of Darwin's law, and it had been found that in the vast majority of plants special appliances exist which will secure a more or less frequent inter cross, and that in many these appliances completely exclude the possibility of self fecundation.

The cross-fertilization of some plants is ensured by the male and female organs occuring in separate flowers either on the same or different plants. Familiar instances of male and female flowers on the same plant are the male catkins of such trees as the butternut, hickory, the birches, oaks and hazels. The female flowers are much less conspicuous but easily recognizable near the tips of the twigs In the willows we find the male and female catkins on separate trees, each tree bearing either staminate male flowers or pistillate female ones. In many cases where the two sexes occur in the same flower self-fertilizing is prevented by the male and female organs coming to maturity at different times, sufficiently far apart for it to be impossible for the pistil to be fertilized by the pollen borne on the same flower. In many cases there are remarkable contrivances which prevent the impregnation of flowers by their own pollen. In the species of primrose—and no better example can be found than the well known house plant from the Himalayas, *Primula obconica*—it will be found that the flowers on different plants are dimorphic, some flowers having the tip of the pistil at the mouth of the tube and the anthers well down towards the bottom, while in other flowers this order is reversed, and the anthers are produced at the mouth of the tube and the pistil is so short that it does not reach half way up. Darwin proved by growing many plants from the seed that by far better plants were obtained by the flowers bearing long or short pistils being crossed with pollen from the other kind of flower. There are some flowers which are actually sterile to their own pollen, but can be fecundated readily with pollen from flowers growing on another plant of the same species. It has been pointed out by Prof. Waugh, of Vermont, that this is the case with the red American plums, and it is also the case with many varieties of apples and pears. This fact at once indicates the important bearing the presence of insects in an orchard at the time of blossoming has upon the production of an abundant fruit crop. Moreover, it can be shown that, owing to its size, weight and habits, no insect is so well calculated to ensure the fertilization of fruit blossoms as the honey-bee, which flies rapidly from plant to plant, and, by running over the flowers in search of pollen or nectar, brushes off the pollen and carries this vitalizing element on the hairs of its body to the next flower visited. The habit of the bees, which has frequently been noticed, of confining the visits when collecting largely to the same kind of plant, is taken advantage off by the bee-keeper to store up at certain seasons particular kinds of honey, such as apple, raspberry, basswood, clover and buckwheat honeys. This habit is also, manifestly, advantageous to the plants on account of the pollen which is carried by the bee being of the kind necessary for the fertilization of its flowers, which could not be effected if the pollen were that of some other kind of plant.

The male and female organs of some flowers are very sensitive, the pollen being cast forth with some violence as soon as the stamens are touched by insects. An instance of this is to be found in the common Canadian swamp plant called Lambkill or Swamp Laurel; the anthers are held down in small depressions round the edge of the corolla, and when an insect visits the flower, the stamens spring up, the anthers burst and the pollen is thrown against the insect's body. The same thing may be observed in the common barberry flower.

In addition to the classes of plants already referred to, which are sterile to the own pollen, and in a few remarkable instances where the pollen is actually poisonous to the pistil of the same flower, there are numberless species which are partially sterile when fertilized with their own pollen, and to a less degree when fertilized with pollen from close relatives such as seedlings from the same parent as the plant bearing the flowers; and finally in a large class where there is no apparent obstacle to self-fertilization, cross-fertilization often occurs from what is known as the prepotency of pollen from another individual over a plant's own pollen.

The agency by which pollen is transported from one flower to another is either animate or inanimate, and certain peculiarities will be found in flowers characteristic of each class. The inanimate agency with most flowers is the wind, and in these flowers the pollen is dusty and exceedingly light, so as to be carried on the lighest breeze ; the flowers are inconspicuous and there is no nectar nor perfume On the other hand, in those flowers which are dependent on an animate agency, which is mainly insects of various kinds, these insects must be attracted to the flowers ; and we accordingly find that brilliant colors and far-reaching odors are developed. These alone, however, would be of small gratification to the visitors ; consequently, something more satisfying is provided, namely, nectar and pollen, which form the food of vast hordes of the insect world, and particularly of the honey bee. Moreover, the remarkable provision is made that these attractions only appear just at the time when the visits of insects can be of a definite benefit to the plant ; and, further than this, an endless variety in the structure of the leaves, stems and flowers of plants makes easy the access of such species as will be of use, but retards or keeps out entirely those which would only regale themselves on the sweets provided without conferring any benefit in return. A pollen grain is somewhat analagous to a seed ; as soon as it reaches the stigma, the viscid portion of the pistil, a sort of growth begins, and delicate tubes are pushed out and run down through the tissues to the ovary. Through these tubes the vitalizing principle (the fovilla) reaches and fecundates the ovules in the ovary. The period during which the pollen and the stigma are in a fit condition for fertilization is only of short duration. Those insects, therefore, which can fly quickly from plant to plant are much better adapted for this work than the slower moving, wingless, creeping insects which would be much more likely to have the pollen brushed from their bodies in their journey from plant to plant or even from flower to flower.

The size even of flying insects is also a matter of importance, so that their bodies may come in contact with the anthers of one flower and the pistil of another, and most marvellous contrivances will be discovered when looked for in the blossoms of flowers, the effect of which is to exclude those visitors which are not profitable Such are modifications in the shape and size of the corolla, the presence of tufts of hair, barbed spikes and bristles around the nectary, the secretion of the nectar at the bottom of long spurs or deep tubes of the corolla, etc. Wingless insects are kept from getting to the nectar by even more numerous constructions : reflexed bristles, copious hairs, viscid glands or viscid rings on the stems, particularly around the flower stalks. In some plants, as the fuller's teasle, the leaves join around the stem, forming a receptacle which catches rain and dew and forms an insuperable barrier.

What also is doubtless a provision for the protection of the seeds of plants is the fact that when plants are eaten by animals or insects, it will frequently be noticed that the blossoms themselves are seldom destroyed. This may be due either to a more abundant production of thorns or bristles around these organs, or that they are rendered distasteful by certain compounds which are more abundantly secreted in the blossoms.

This fascinating branch of my subject is far too wide for me to more than refer to it now ; but I am convinced that the shape, position, nature and adornment of every part of a plant has some special significance if we can only discover it. That we have not yet perceived of what these advantages are, by no means justifies us in assuming that no advantage exists, and the search for the true meaning of the innumerable shape of flowers and leaves, their positions and behaviour under varying circumstances provide a limitless source of pleasure and valuable instruction to whoever takes the matter up earnestly, verifying carefully each observation and exercising every care not to be carried away by the subject and jump to conclusions.

I have with me here to-day some excellent charts made by my friend, the Rev. Thomas Fyles, of Quebec, the President of the Entomological Society of Ontario. These will enable me to illustrate some of the points I have referred to far better than I could otherwise have done.

(Some fine coloured charts were here exhibited, and much interesting information was given about each in turn. Some of the points explained were the following :)

Although so small these minute pollen grains are just as characteristic and easily recognizable under the microscope as the various kinds of seeds. The pollen of pine trees, which is very light is produced in enormous quantities, and when carried on the wind

and deposited at a distance, has sometimes been taken for showers of powdered sulphur. One remarkable instance as illustrating the extreme lightness of these pollen grains was the occurrence of one of these so called sulphur-showers on the deck of a ship nearly 200 miles from land. The doctor of the ship happening to be a botanist detected at once by putting some of the material under his microscope, the true nature of the yellow deposit, by recognizing the peculiar shape of the pine pollen. Some of the patterns on the surfaces of pollen grains are remarkably beautiful.

Mouth parts of the honey bee and wasp were shown. The difference in the mandibles of these insects were pointed out and explained. The mandibles of the honey bee are provided for the working of wax, and this only when softened at a high temperature. Those of a wasp for gnawing wood for the manufacture of the paper with which they surround their nests.

Flowers of plants of the pea family were illustrated by figures of the broad bean, sweat pea, and broom; and the different structures explained in their bearing on the question of cross fertilization, attention being drawn to the brush like stigma and the elastic keel.

Flowers of the sunflower family present many points of interest; the showy ray flowers which attract insects from a distance, as well as the more perfect disk flowers in which the anthers are joined into a tube shedding the pollen inwardly. This is pushed out by the unopened pistil, and the pistil itself does not open until it is raised well above the pollen of its own flower, and then its viscid disk is its upper surface which comes in contact with the under surface of any insect crawling over it.

Figures were shown of the two forms of Primrose flowers already referred to, one having a long pistil and low seated anthers, the other a short pistil but anthers at the mouth of the tube of the corolla. It was pointed out that a moth in sucking the nectar from these flowers would convey the pollen from one kind of flower to the pistil of the other, and that experiment had shown that more vigorous plants were produced as a consequence.

Attention was drawn to the markings and tufts of hair in the throat of the garden flower known as the Nasturtium, which acted as path finders to insects of a proper size and shape to secure the fertilization of the seeds.

The necessity of a large strong insect such as a bee to open the Snapdragon flower and reach the nectar was evident, but it was stated that the bees sometimes gnawed a more direct entrance to the nectary at the base of the flowers. After this entrance was made the speaker had frequently seen honey bees rifling the flowers instead of entering by the proper opening. This he believed was an analogous case to these insects sucking the juice from injured fruit.

One chart which was of special interest showed the flowers of the Night Flowering Catchfly, which belongs to the Pink family. In this there are ten stamens, and the flowers open after sundown, when they are white and conspicuous, sweet perfume is emitted, and during the first evening of the three in which each flower expands five of the anthers are pushed out of the tube of the flower and shed their pollen; then they dry up and fall away. The next morning the petals curl up and present the appearance of a faded flower. During the day there is no perfume, but in the evening the petals again unfold, the scent returns, and the other five anthers appear. It is not until the third evening, when all the pollen is exhausted that the pistil lengthens out and exposes itself to receive pollen from other flowers.

In bringing this interesting address to a close, Dr. Fletcher urged the bee-keepers to strive and put themselves in the position of being able to give definite opinions on such important questions as this one, which had now come up for consideration, and pointed out that it was one which concerned every one of them; that as a society they should band themselves together for mutual protection, not against fruit growers or anyone else, but simply to be able to speak positively and give the actual truth with regard to these and similar matters. For his part he was quite sure that bees did not injure fruit, however ripe it might be unless the skin was actually cracked beforehand, or had been injured by birds or other insects. Many enlightened fruit-growers know only too well the enormous advantage of having bees near their orchards, and some actually keep bees simply for the benefit to be derived from these useful little insects in fertilizing the flowers. The study of insect life was full of fascination, and no one could appreciate this more keenly

than bee-keepers, because the life history of the honey bee was probably on the whole more interesting than that of any other known insect. The false statements that were made about bees were due to the prevailing ignorance as to the habits of insects, an unfortunate state of affairs which was too often manifested by the destruction of all insects whether injurious or not by thoughtless persons. Many people were surprised to learn that there were just as many beneficial insects as injurious ones, and yet some would destroy all indiscriminately.

Spiders were instanced as distinctly beneficial insects which were killed by most people. The speaker claimed that we had no poisonous spiders in Canada, and that the instances recorded in newspapers by people who are bitten at night by "small black spiders" which had been seen just vanishing over the edge of a pillow were cases of mistaken identity, and were equally untrustworthy with the accounts of people being killed by wolves (in America), or children carried away by eagles. He was sure that a fuller knowledge of the habits of bees would bring about a better understanding between fruit-growers and bee-keepers, which would be of enormous advantage to both, for their interests were identically the same. (Applause).

Mr. NEWTON: It has afforded me great pleasure to listen to this very able address which Prof. Fletcher has given. We want such addresses as the Professor gave to us this morning. It has been a very instructive and pleasing address, because we have all enjoyed the bright sides of it as he has been going along, and I hope in future meetings we will have the opportunity of having an address similar to the one we have had to-day. I would say, also, with the Professor, let each one of us during the coming year be on the alert and try to find out something in the interests of that which we have been talking of this morning, especially with regard to the fruit industry; because we do not know what day some similar trouble may arise, and if we are on the alert we will have some evidence whereby we may be able to help a brother if we are not helping ourselves.

Mr. McEVOY: The work of Prof. Fletcher has been of the greatest value to bee-keepers. It was largely through his instrumentality that the bill with regard to the spraying of fruit was passed through our Local House, and therefore the very best thanks of this Association are due to Prof. Fletcher.

Mr. ROOT: I wish to say that I have heard a great many addresses on this one subject. I have attended a good many conventions, as you probably know, and it seems to me, although I do not like to say it in Prof. Fletcher's presence, this is the best address I have ever heard on this subject.

Mr. HOLMES: This is no doubt the best address we have ever listened to. It has been a rich treat; not only have we heard of the relation of bees to plant life, but the Professor has given us some very valuable information on this much vexed question of bees injuring fruit.

Mr. HALL moved, seconded by Mr. DARLING, that the address given by Prof. Fletcher be printed in pamphlet form for future use, and that it be distributed amongst the members of the Association. Carried.

QUESTION BOX.

Q.—What is the best way to keep pollen out of sections?

Mr. SIBBALD: I have never had any trouble in keeping it out. It should be started below before the sections are put on, and when they have sufficient room for pollen below then put on your sections. Use a shallow hive. It would be perhaps a good thing to put on a queen excluder.

Q.—What is the best kind of can to ship honey in?

Mr. SIBBALD: I think the sixty pound can is the best to ship in. Small packages are more useful for the retail grocers. For wholesale houses I advise large tins or barrels.

Q.—How to run an out yard without an attendant being there all the time?

Mr. SIBBALD: If we go to our yards once a week and examine the brood nest we will find what condition each hive is in, whether it is ready to swarm or not; have your queens all clipped, examine the yard once a week and if any have swarmed you have got

to look after the queen cells, or else there will be a young one that will lead the swarm away. Give them another queen with the wings clipped or destroy all the cells.

Q.—What about working for long tongued bees on short flowered red clover?

Mr. SIBBALD: I am sure that would be all right. I have never tried anything along that line, but I hope they will get them long enough to reach the red clover.

Q.—How best can the swarming impulse be controlled in out-yards without an attendant?

Mr. SIBBALD: In controlling swarming I believe in giving plenty of room and in giving it early; do not let them get too much crowded. Give plenty of ventilation. Shade the hive. All these things help.

Q.—Is it advisable to exhibit at Buffalo, New York and Glasgow, Scotland?

Mr. SIBBALD: I believe in exhibiting honey and advertising yourself as much as possible.

Q.—If you had an apiary in Manitoba, and had no cellar or suitable place for one, what method would you follow to make a success of wintering bees?

Mr. SIBBALD: I do not know much about Manitoba, never having been there, only having heard of the climate they have. I fancy if I had not a cellar there I could winter in some of the reliable out door methods employed here. I do not see why it would not work there just as well as here.

Mr FIXTER: In my case I would dig a pit every time if you can get a place where you are sure the water will not get into it. I would not attempt to winter the hives above the ground.

Mr. SIBBALD: I have heard that in Manitoba the frost goes down fifteen feet.

Mr. FIXTER: In one of our winter experiments with the pit I found there was slight change in the temperature, but I put a load of horse manure over it and brought the temperature right up. In Manitoba I would be very careful and watch the temperature, and if I found it was getting down too low I would cover it up in that way with ordinary horse manure. In every case see that they have ventilation.

Q.—What is the best material to use for smoker fuel?

Mr. SIBBALD: I have always used cedar bark. I have heard of rags, pulp and shavings. Shavings work all right.

Mr. MCEVOY: Sometimes you will have to change it. If you get hold of a pretty cross colony take some fine grass hay It is just according to what you have got. I hold that if you have got an ordinary yard use cedar bark; if you get hold of a cross customer that you want to bring to time use the hay.

Mr. HOLMES: Cedar bark is the most satisfactory I have ever used.

Q.—Is it best to re queen and how often?

Mr. SIBBALD: I believe in re-queening. I re queen more than Mr. Hall does. He believes in keeping them three or four years. I have always found a larger per cent. of my colonies in good shape that contain a young queen. Perhaps that is a mistake I have been making in not getting the right breed of queens. We will have to work that out and think about it, and experiment along that line. Perhaps Mr. Fixter can help us a little on that line.

Q.—Have you ever noticed bees gathering honey from apple tree buds just opening in the spring about two weeks before the blossoms from the same tree are in bloom?

Mr. SIBBALD: I have noticed them around buds; I do not know whether they get honey or not.

Prof. FLETCHER: I am not quite sure about propolis being gathered from apple buds but propolis comes from the buds of trees.

Mr. CHRYSLER: I have noticed it; it is a small white drop of nectar, it is very sweet and as near as I can make out it tastes more like clover honey right on the buds I never noticed it before except the one year and I noticed it on a common apple tree, on one of the grafting varieties. I did not notice it on other trees to that extent at all.

Prof. FLETCHER: Prof. Cook mentions about finding in California trees that had drops of delicious honey on them which he said were secreted by the tree.

The meeting then adjourned.

ANNUAL REPORTS

OF THE

POULTRY ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO,

1900.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE).

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TORONTO.

THE POULTRY ASSOCIATION OF ONTARIO, 1900.

To the Honorable the Minister of Agriculture :

DEAR SIR,—I have the honor to submit herewith the Report of the Poultry Association of Ontario.

Your obedient servant,

A. P. WESTERVELT,
Secretary.

THE POULTRY ASSOCIATION OF ONTARIO.

OFFICERS FOR 1901.

Honorary President	F. W. Hodson	Ottawa.
President	A. W. Tyson	Guelph.
1st Vice-President	W. McNeil	London.
2nd Vice-President	M. T. Burn	Tilsonburg.
Secretary-Treasurer	A. P. Westervelt	Toronto.
Auditor	H. B. Donovan	Toronto.

Directors :

D. C. Trew	Lindsay.
James Dundas	Deer Park.
John Crowe	Guelph.
Charles Massie	Port Hope.
T. H. Scott	St. Thomas.
John Ramsey	Owen Sound.
A. Bogue	London.
W. Kedwell	Petrolea.
Dr. A. W. Bell	Toronto.
W. R. Graham	Guelph.

Delegates to Industrial Exhibition, Toronto	W. Barber, Toronto.	W. Fox, Toronto.
" *Western Fair*, London	J. H. Saunders, London.	W. H. Beattie, Wilton Grove.
" *Winter Fair Board*	W. McNeil, London.	A. W. Tyson, Guelph.
" *Central Fair*, Hamilton	R. Mackay, Hamilton.	G. G. Henderson, Hamilton.
" *Southern Fair*, Brantford	T. A. Cox, Brantford.	W. Colwell, Paris.

THE POULTRY ASSOCIATION OF ONTARIO.

ANNUAL MEETING.

The annual meeting of the Ontario Poultry Association was held in the lecture room at the show buildings, at Guelph, on December 13th, 1900, and was very largely attended. We have been at more harmonious gatherings, but the discussion while sharp at times, shows that the members are thinking for themselves and are alive to the wants and shortcomings—as each sees them—of the Association.

Vice-President M. T. BURN, occupied the chair at the fore part of the meeting, but on election of the new president, vacated in his favor.

The minutes of last meeting as published, were taken as read. The Treasurer's report was read and adopted. The Committee on By-laws reported progress.

On suggestion of Mr. HODSON, a committee of three, consisting of Mr McNeil, the Secretary, and Mr. Donovan, were required to meet at once to draft by-laws and rules, and to submit same to each director for approval.

The officers for 1901 were then appointed.

On motion of Mr. DONOVAN, seconded by Mr. CROWE, the entire work of the directors in regard to the recent amalgamation was sanctioned, and they were thanked for their efforts on behalf of the Association. Mr. Crowe was greatly in favor of the move, and Mr. McNeil eulogized the work of the Secretary and of Mr. Hodson, who was the instigator of the movement.

Mr. CROWE would like to see all Game classes cooped singly, as many females were badly pecked by the males when penned in pairs. Mr. Barber fully endorsed this.

Letter on selling fowls by weight, referred to new Board.

Mr. DONOVAN stated that the express companies had gone quietly back to the old rate of two first-class rates, no matter in what manner the stock was shipped. As individuals, little could be done, but the strong Fat Stock Association and the Poultry Association of Ontario should be able to bring pressure enough on the companies to cause them to restore the single rate on heavy coops. Referred to new Board for action.

Mr. M. T. BURN would like to see a meeting of the directors prior to the Industrial Fair, at which he could be present, to decide regarding judges. He for one, was not satisfied with the judging, and under present conditions would not return as an exhibitor. He would favor importing new blood; lots of it was to be had.

Mr. TEALE entered his birds to be judged, and found the cards placed by an exhibitor. Was this fair? The judge gets out and cannot be found to give reasons for his decisions.

Mr. MCNEIL: We have the best judges in America; you should see some of the judging on the other side.

Mr. BARBER: We have the three best judges in America, but I do not see how we employ a man who comes here for a few hours, and then clears out.

Mr. HODSON spoke strongly against judges leaving before the show is over.

T. H. SCOTT: Some of our judges are large breeders, and frequently the man who owns the birds, also judges them.

A Member: We should have no names on coops.

The meeting then adjourned.

MEETING OF THE ONTARIO DIRECTORS.

A meeting of the new board of the "Ontario" was held immediately following the annual meeting. On motion, Mr. Donovan was asked to act as secretary of meeting.

Mr. WESTERVELT was re-elected secretary-treasurer at same salary as before, and H. B. DONOVAN as auditor.

A cordial vote of thanks was tendered (through Mr. Tyson) to the corporation of the City of Guelph for the magnificent accommodation supplied for the combined show.

On the motion of Messrs. TREW and RAMSEY, Messrs. Bogue and McNeil were empowered to discount a note for amount required to pay all expenses and debts, and not exceeding the amount of government grant, *i. e.*, $900.

Mr. DUNDAS thought the Dominion might be induced to assist.

Mr. HODSON, Live Stock Commissioner for the Dominion, stated all poultry work done from his Department in the Province, would be done through the "Ontario." Mr. Hodson also spoke at some length on the two Poultry Associations receiving Government aid, and would suggest making the dividing line at Yonge street (Toronto), and petitioning Hon. Mr. Dryden to increase grant to $1,000 each

Moved by Mr. BOGUE, seconded by Mr. TREW and carried, that this Board endorse Mr. Hodson's programme in full.

Mr: BURN would like to see the classification extended to take in all standard varieties, to apply to all sections of fowls, turkeys, geese, ducks, and pigeons.

Mr. HODSON advised care in the adding of purely fancy varieties to the list. In other branches the tendency was rather the other way.

Moved by Mr. HODSON, seconded by Mr. BURN and carried, that an "Experiment Committee" be formed, consisting of the President, Vice President, and Mr. Graham, of the Guelph College, to lay a series of experiments in feeding, etc., along practical lines before the members of the Association. Mr. Hodson promised that the expenses for the first year would be borne by his department.

Moved by Mr. DUNDAS, seconded by Mr. BURN and carried, that Mr. Donovan be asked to draft a strong letter to Hon. Sydney Fisher and Hon. John Dryden asking their aid in an effort to restore the express rates on poultry to the old schedule of one first-class rate.

A hearty vote of thanks was given Mr. HODSON for the interest he had taken in the successful amalgamation of the Fat Stock Association and the "Ontario." He it was who first intimated the desirability of such a move to the officers. Mr. Hodson briefly replied, thanking the directors for their confidence.

Hon. J. R. STRATTON was made a patron of the Association.

The regular Directors' Meeting is to take place on the second Thursday of Toronto Fair in the Government tent at 2 p.m.

At future shows, birds must positively be in the building before 12 p.m. on Monday, judging to begin sharp at 10 a.m. on Tuesday. Judges are to be employed for the full duration of the show, and will be asked to give reasons for their decisions in the lecture-room on some breeds specified beforehand in the regular programme.

FINANCIAL STATEMENT OF THE POULTRY ASSOCIATION OF ONTARIO.

RECEIPTS.		EXPENDITURE.	
Cash on hand from previous year, as per last report	$145 12	Grants to other societies, fairs, etc	$115 00
Members' fees	101 00	Cash paid for prizes	1,676 00
Donations	361 50	Officers' salaries	150 00
Legislative Grant	900 00	Directors' fees and expenses	50 60
Entry fees	625 52	Postage and stationery	20 06
Money borrowed for one year	100 00	Printing and advertising	59 67
Interest from bank	6 14	Judges' expenses	125 00
		Discount, Legislative Grant	27 00
		Miscellaneous—	
		Interest for one year on loan	5 95
		Auditor	10 00
	$2,239 28		$2,239 28

A. P. WESTERVELT, Treasurer.

Examined and found correct, this 15th day of September, 1900.

H. B. DONOVAN, Auditor.

LIST OF MEMBERS, 1901.

Name.	Post Office.	Variety of specimens exhibited.
Anderson, Wm	Guelph	
Anderson, Mrs	Guelph	
Armstrong, Thos. S	Fergus	Cochins, Plymouth Rocks, Wyandottes, Games, Minorcas.
Armstrong, Adam A	Fergus	Plymouth Rocks.
Auld & Auld	Eden Mills	Wyandottes, Ducks.
Barber, Wm	Toronto	Games, Bantams.
Barber, Chas. W	Guelph	Plymouth Rocks.
Baskerville, Harry	Bowmanville	Spanish.
Barr, W	Woodstock	Leghorns, Bantams.
Baulch, J. H	Port Hope	Pigeons.
Beattie, W. H	Wilton Grove	Turkeys.
Bell, Dr. A. W	Toronto	
Bell, W. J	Angus	Leghorns, Turkeys.
Bessey, W. H	Coleman	
Berner, G	Toronto	Leghorns.
Bennett, J. E	Toronto	Plymouth Rocks.
Bogue, Allan	London	Polands, Houdans, Cochins, Hamburgs, Dorkings, Geese, Ducks.
Bogue, Geo	Strathroy	Wyandottes, Dominiques, Javas, Leghorns, Spanish, Red Caps, Houdans, Ducks.
Brierley, Geo	Guelph	Leghorns.
Bonnick, Chas	Toronto	
Brown & Leavens	Durham	Plymouth Rocks, Javas, Leghorns, Turkeys.
Buchanan, Robt	Gourock	
Burn, M. T	Tilsonburg	Langshans, Dominiques, Javas, Leghorns, Spanish, Game, Bantams, Polands, Geese, Ducks, Pheasants, Pigeons, Rabbits.
Butler, Jno	Woodstock	Plymouth Rocks.
Cadman, Wm	St. Thomas	Leghorns.
Cann & Daniel	Plattsville	Wyandottes.
Cameron, John	Brantford	
Campbell, W. J	Snelgrove	Plymouth Rocks.
Chamberlain, Geo. H	Guelph	Games.
Carroll, Jas. A	South London	Plymouth Rocks, Wyandottes, Red Caps.
Coates, Dr. R. C	Thamesville	Leghorns.
Colson, Jno	Guelph	Plymouth Rocks, Ducks.
Cox, T. A	Brantford	Leghorns, Games, Dorkings.
Cosh & Co., Newton	London	Plymouth Rocks, Wyandottes, Andalusians.
Crowe, Jno	Guelph	Games.
Crowe, C. R	Guelph	Bantams.
Crowe, R. H	Guelph	Leghorns, Belgian Hares.
Colwell & McDonald	Paris Station	Wyandottes, Leghorns, Red Caps, Games, Bantams, Houdans, Geese, Turkeys, Ducks.
Corcoran, J. L	Stratford	
Daniels, C. J	Toronto	Plymouth Rocks, Wyandottes, Javas, Leghorns, Spanish, Red Caps, Games.
Dewar Bros	Milton	Wyandottes, Leghorns, Bantams.
Dick, Wm	Brantford	
Dixon, J. M	Guelph	
Donovan, H. B	Toronto	Bantams, Ducks, Pigeons.
Dundas, Jas	Deer Park	Cochins, Leghorns.
Emerick, Henry	Bridgeburg	Cochins, Plymouth Rocks, Bantams.
Elliott, And	Pond Mills	Turkeys.
Elliott, Wm	Oshawa	Plymouth Rocks, Hamburgs.
Field, Fred	Cobourg	Wyandottes, Games.
Fink, A	Woodstock	Dominiques.
Fried & Son, J	Roseville	
Ford & Son, Jas	Drumquin	Turkeys.
Forster, Mrs. W. R. C	Branchton	Plymouth Rocks.
Fox, Wm	Toronto	Rabbits.
Garside, Jos	London	Brahmas.
Gray, J. H	Harriston	Plymouth Rocks.

LIST OF MEMBERS—*Continued.*

Name.	Post Office.	Variety of specimens exhibited.
Graham, A. W	St. Thomas	Wyandottes, Leghorns.
Greig & Barnsdale	Stratford	Leghorns.
Gibson, S. A	Ingersoll	Wyandottes.
Golding & Son, G	Toronto	Games.
Gould, Peter	Guelph	Cochins, Polands.
Gow, Geo	Fergus	Plymouth Rocks.
Good & Harron	Berlin	Leghorns, Minorcas, Orpingtons.
Groom, Percy G	Guelph	Wyandottes.
Gould, Chas. B	Glencoe	Brahmas, Langshans, Turkeys, Ducks.
Guttin, A	Owen Sound	Plymouth Rocks.
Grundy, Joe	Guelph	Leghorns.
Harris, Ben	Woodbridge	Langshan, Wyandottes.
Harding, H. H	Thorndale	
Heaven, C. C	Oakville	Plymouth Rocks, Wyandottes.
Henderson, G. G	Hamilton	Leghorns.
Henderson, T. J	Guelph	Wyandottes.
Henderson, J. S	Rockton	Plymouth Rocks, Minorcas, Turkeys.
Hertel, C	Hanover	Wyandottes.
Hill, A	Wyoming	Plymouth Rocks.
Hodson, F. W	Ottawa	
Howard, Geo. T	Guelph	Langshans.
Hawthorne, Jas	Brantford	Games.
Ionson, G. A	Ingersoll	Plymouth Rocks.
Jeffrey, J. S	St. Catharines	Plymouth Rocks, Wyandottes.
Karn, H	Guelph	Langshans, Ducks.
Knapp, Otto W	Durham	Leghorns.
Kedwell, J. W	Petrolea	
Kincaid, C. A	Lyn	
Kirby, S	Woodstock	Plymouth Rocks, Wyandottes.
Kiley, T. J	Aylmer	Wyandottes, Javas, Games, Bantams.
Knight, Isaac T	Guelph	Plymouth Rocks.
Kinder, G. W	Strathroy	Wyandottes, Red Caps, Games.
Kilner, A	Guelph	Brahmas, Cochins.
Latta Bros	South London	Cochins, Games.
Laidlaw, Wm	Guelph	
Langelier, Gus. A	Quebec	Brahmas.
Lake, A. H	Toronto	Plymouth Rocks.
Lee, Roger M	Galt	Leghorns, Pheasants.
Long, D. A	Russells	
Luxton, A. G. H	Georgetown	Dominiques, Leghorns, Turkeys, Geese.
Magill, J. H	Port Hope	Wyandottes, Pigeons.
Massie, Chas	Port Hope	Wyandottes, Pigeons.
Masson, Jas	Woodstock	Leghorns.
Marriott, W	Guelph	
Meyer, J. E	Kossuth	Plymouth Rocks, Wyandottes, Dorkings.
Millard, J. K	Dundas	Plymouth Rocks, Leghorns, Minorcas.
Milton & Mitcheltree	London	Andalusians.
Minshall, J. H	Brantford	Minorcas.
Monk, Mrs. J. F	Toronto	Bantams.
Moore, T. J	Guelph	Leghorns.
Modlin, John	Hamilton	Games.
Moore & Kingsmill	London West	Wyandottes, Bantams.
Mueller, Chas	Waterloo	Plymouth Rocks, Leghorns.
McMaster, W. A	Guelph	
McKay, Josiah	Clachan	Plymouth Rocks.
McNeil, Wm	London	Cochins, Hamburgs, Bantams, Polands.
McNellis, P. H	Brantford	Plymouth Rocks.
McKeague, S. A	Acton	Plymouth Rocks.
McKee, Jno	Norwich	Dorkings.
McKinnon, Jno	Guelph	
McPhie, Norman D	Hamilton	Pigeons.
McLoud, Wm	London	Plymouth Rocks.
McDonnell, F. P	Watford	Cochins, Wyandottes.
McCormack & Son, J	Rockton	Plymouth Rocks, Bantams, Dorkings, Ducks.
McDougall & Son, A	Milton	Turkeys.
McCurdy, R	London	Langshans.
Nahrgang, G. W	Palmerston	Pigeons, Rabbits.
Newell & Sons, J. R	Crampton	
Norris, Jas. E	Guelph	Plymouth Rocks.

LIST OF MEMBERS—*Concluded.*

Name.	Post Office.	Variety of specimens exhibited.
Oke, Richard	London	Cochins, Wyandottes, Javas, Leghorns, Hamburgs, Games, Bantams, Sultans, La Fleche, Creve Coeurs.
O'Neil, J. N	Toronto	Minorcas.
Parsons, J. H	Osaca	Plymouth Rocks, Games.
Pembleton, R	Guelph	Cochins.
Philpot, Jno	Guelph	Games.
Poole, Geo	Guelph	Wyandottes.
Pollock, W. E	Norwich	Leghorns, Houdans.
Porteous, Jno. W	Galt	Plymouth Rocks.
Powell, W. B	Fergus	Bantams, Ducks.
Poole, Jr., J	Lambeth	
Rankin Bros	Owen Sound	Bantams.
Ramsay, Jno	Owen Sound	Leghorns.
Readwin, A. & T	Guelph	Plymouth Rocks, Wyandottes, Javas, Leghorns, Bantams.
Ryde, Chas	Guelph	Leghorns.
Rice, Thos	Whitby	Plymouth Rocks, Leghorns.
Rutherford, W	Roseville	
Roos, P. H	Waterloo	Leghorns, Bantams.
Sallows, H	Guelph	Games, Bantams.
Sage, L. C	London	Brahmas.
Saunders, J. H	London	
Saunders, R. H	London	Plymouth Rocks.
Scanlan Bros	Ennotville	Leghorns, Turkeys, Ducks.
Senior, T. J	Hamilton	
Stewart, A. D	Galt	Plymouth Rocks.
Sherwood Bros	Fergus	Brahmas.
Sheridan, T. J	Oshawa	Brahmas, Langshans, Plymouth Rocks, Leghorns.
Stewart, Chas A	London	Cochins.
Stepheny, H	Myrtle	
Snyder, Elias	Burgessville	Plymouth Rocks.
Silverwood, A. E	Lindsay	
Stone, J. F	Toronto	Orpingtons.
Scott, T. H	St. Thomas	Wyandottes, Leghorns, Langshans, Plymouth Rocks.
Shore, T. F	White Oak	Dorkings.
Southcote & Bartlett	London	Wyandottes, Leghorns.
Sloan & Scrimgeour	Guelph	Plymouth Rocks, Games.
Sully, D	Guelph	Ducks.
Spry & Mick	Toronto	Leghorns.
Traplin, Thos. H	Hespeler	Wyandottes, Andalusians.
Teale, W. J	Guelph	Games, Bantams, Houdans.
Trew, D. C	Lindsay	Plymouth Rocks, Houdans.
Tyler, W. H	Guelph	Pigeons.
Tomalin, Jos	Deer Park	
Tozer, H	London	Bantams, Leghorns.
Troth, Ferdinand	Toronto	Games.
Thompson, Jno	Fergus	Brahmas.
Thompson, A	Allan's Corners, Que.	Plymouth Rocks.
Tyson, A. W	Guelph	Bantams, Canaries.
Thorpe & Scott	London	Brahmas.
Turville, F. N	London	Bantams.
Vance, C	Woodstock	Games.
Wallace, H. H	London	Plymouth Rocks.
Wangenheim, R	Brantford	Pigeons.
Walker, Geo	Bowling Green	
Walker, Jas	Fergus	Plymouth Rocks.
Wyatt, Hugh	London	Brahmas, Cochins.
Wray Bros	London	Wyandottes.
Wedgery, Jas	Woodstock	Wyandottes.
Wells, Thos	Guelph	Bantams.
Webber, F. R	Guelph	
Whetstone, Geo	Guelph	Bantams.
Wilson & Sons, W. C	East Oro	Cochins, Leghorns, Houdans.
Wicks & Sons, E	Mt. Dennis	Hamburgs, Houdans, Orpingtons, Ducks.
Wixson, F	Ingersoll	Leghorns.
White, Geo. J	Hamilton	Pigeons.
Whillans, Geo	Toronto	Leghorns.
Wylie, Geo	Owen Sound	Plymouth Rocks.
Wilson, Matt	Fergus	Plymouth Rock, Minorcas.
Wright, W. E	Glanworth	Turkeys.
Wilson, J. A	Seaforth	
Woodrow & Sons, H. J	Woodstock	

ADDRESSES ON POULTRY AT THE PROVINCIAL WINTER FAIR.

By W. R. Graham, O. A. C., Guelph.

I have here two specimens of chickens. The first specimen was fed for three weeks on oats, buckwheat, corn, and skim milk. The second specimen is an ordinary chicken, such as is usually sold on the market. You will observe that the difference in their condition is very marked. Chickens of the type of the second specimen are usually sold on the Guelph market at 60 cents per pair. That chicken weighs three pounds and costs ten cents per pound. After drawing and removing head and feet, it lost fifteen ounces. The weight of the bone was 7 ozs, leaving an edible portion of one pound two ounces.

The second chicken was fattened for 24 days and weighed 3 lbs, 14 ozs. I purposely selected the smallest one I could get. The offal weighed 14 ozs, and the weight of the bone 7 ozs.

From the consumer's standpoint, if the first chicken was worth 30 cents, the second one would be worth 38¾ cents at 10 cents per pound. After they are cooked, if the first is worth 30 cents to the consumer the second is worth 45 cents in proportion to the amount of meat obtained. When you buy a lean chicken, you buy a tremendous lot of offal and bone and very little meat. That is from the consumers' point of view. Now, as to the producer. The question is, does it pay the producer to fatten chickens. This year at the College we have fattened about 400 birds. We fed about 100 in each lot. After they were dressed and crated, half were sent to a Montreal firm and half to the William Davies Co. of Toronto. I asked the consignees for a report on each lot, showing where they suited and where they were wrong. I told them not to specially advertise them as coming from the College, and so obtain bigger prices, but to give me the same prices as the ordinary farmer would get.

In feeding these birds, I took eight rations, and divided the birds into eight lots, feeding each lot on a separate ration, and compared the results.

The rations were as follows :

1. Two parts of barley, by weight, and two parts of oats, finely ground, and one part of corn meal.
2. Two parts of oats, two or corn, and one of wheat.
3. Two parts of corn, two of buckwheat, and one of oats.
4. Two parts of oats, two of corn, and one of peas.
5. Finely ground oats.
6. Rolled oats.
7. Two parts of corn and one of oats.
8. Two parts of corn, two of oats, and two of potatoes.

In all cases the rations were mixed with skim milk, either sweet or sour. Our experiments tended to show that we got our greatest gain during the first two weeks, and most of all in the second week ; in the third week the gain tends to decrease.

In our first test, 75 per cent. of the birds were pure-bred Plymouth Rocks and Wyandottes, and the remainder crosses and scrubs. The results were very much in favor of the pure-bred birds. In one instance we found that in the three weeks a scrub bird gained 1¼ lbs, and a pure-bred 3¼ lbs. The pure-bred bird I refer to was reported on by The Wm. Davies Co. as exceptionally fine. He sold for 14 cents per pound, and brought us over a dollar. After we started cramming, however, both gained alike. We found that the finished article cost us ¾ cent. more for the scrub than for the pure-bred or high-grade.

As to Ration No. 2 : Several people recommended this very strongly. I expected, therefore, that it would turn out first-class, but unfortunately, it did not. In every case I lost one bird out of twelve on this ration. They simply went off their feed and died. In four trials, I lost one every time. Taking an average of the 11 birds that lived, the price of a pound of gain cost 2½ cents for pure-bred birds and 5 cents for scrubs. The pure-breds did not care much for the ration and the crosses would not eat it. The actual cost of the gain in the finished pure-breds was 4 cents and of the scrub, 7 cents.

In Ration No. 3, you will see we have buckwheat. This is undoubtedly the most pleasant ration to feed, because the birds will eat it right along, and take it with relish.

Ration No. 4, is a pretty fair one, and gives fairly good results, but the chickens are inclined to become satisfied with a small amount. The peas appear to make the feed rather heavy or strong, and they do not relish it as well as No. 3.

Ration No. 5 is finely ground oats. I should like to say here that there is all the difference between finely ground and coarsely ground oats. The fine ground will have to be purchased from the rolled oat mills. I made an experiment with coarse oats, and the difference was nearly three cents per pound in favor of the fine.

Ration No. 6 : We got the rolled oats for this ration at $1.25 per hundred. They were fresh, but not first-class for porridge making. Some hold that the feeding value of oats is in the meal only, but we find that there is practically no difference between oats with the hulls and oats without.

Ration No. 7 is principally a corn ration. The reason it is not all corn is because we found in previous experiments that for growing birds corn fed alone is not entirely satisfactory. For birds that have done growing and need simply to be fattened, it is all right.

Ration No. 8 is an old standard mixture. It is a good ration, but not superior to number three, unless you have a lot of little potatoes that you want to use up.

In Ration No. 3, the results would probably have appeared a little better had we been able to purchase the buckwheat at less cost. Guelph, however, is not a buckwheat district. I had been in the habit of buying it at 35 cents a bushel, and was astonished when I was asked $1.10 to $1.20 per hundred. The ration would cost much less in some other districts, and you must take that into consideration.

Rations Nos. 8 and 3 are the ones I would recommend. Either of them will make white meat provided you feed with skim milk. I formerly believed that the consumer wanted yellow meat. It is the opposite : they favor light cream, and do not like yellow birds—that is in Toronto.

The first shipment I sent to the William Davies Co. were light chickens, weighing about three pounds each. They were put up in the hot weather. The report was that they were rather thin and not meaty enough. They had not been crammed. They were white, and they reported that their color was good ; so I found out that they wanted white meat. In order to make sure I wrote them, asking what kind of meat they favored, and also as to the weight of bird. They replied that they preferred light cream colored meat, and that birds weighing from four pounds upwards were in favor.

Then the thought came to me, would it not be profitable to cram these birds. But we had been losing money on our cramming experiments. I decided that if we could get enough extra price for the crammed birds to pay it would be advisable, as apparently from two weeks' feeding our birds lacked in breast, a part that fills out when being crammed. Accordingly I shipped one lot to Toronto and one lot to Montreal, consisting of half crammed and half uncrammed birds. Each chicken was numbered and a record kept, so that that the buyers knew nothing about the birds. I asked for a report on each individual, and to make sure I got a satisfactory report, the Davies Co. allowed me to send the birds to one particular store instead of distributing them between a number of stores. I had found from previous shipments that a good deal depended on the locality of the store whether we got 12c. or 14c. per pound. From one store we had received excellent reports. They went over each individual bird. I sent the birds to this store and said that if one bird was worth two cents more than another I should like them to say so.

The following is a portion of the reports :

Number.	Weight.	Sold per pound for	Remarks.	Kind of bird.
	lbs.	cts.		
87	4	12	Light cream color, high breast bone, not enough meat	Grade, not crammed.
88	4.10	11	" " " could stand more meat, enough fat.....	Rock, "
38	4.2	12	" " " thin, bad breast	Scrub, "
106	3.4	12	" " " enough fat, could stand more meat	Scrub, crammed.
98	3.10	12½	" " " fat enough, quite a lot of meat for a small bird	Grade, "
105	4	12½	" " " fat enough, good frame, could stand more meat...	Grade, not crammed.
102	5.5	13	" " " lots of meat and not too fat, a splendid bird..	Pure Rock, not crammed.
95	7¼	14	" " " lots of meat and not too fat, exceptionally fine bird.....	Pure Rock, crammed.
89	4.4	12½	" " " nice and plump, not too fat	Grade, "
			Mr. Gatehouse, of Montreal, reported that the crammed chickens were better chickens for his trade, but made no difference in price.	

The average weight of the crammed chickens was 4 lb. 9 oz and the price twelve and five eighths cents per pound. The average weight of the uncrammed was 3 lbs. 15 oz., and the price twelve cents per pound, a difference of nearly three-quarters of a cent less, or of about 10 cents per pair in favor of the crammed birds Both lots were fed for 24 days, the last ten days of which was by cramming machine, in the case of the crammed birds.

Q. What was the date of these sales?

Mr. GRAHAM: December 5th of this year.

Q. Were they drawn?

Mr. GRAHAM: Undrawn. Heads and feet on; but bled. We find that chickens not weighing 3½ pounds will not pay to put up to feed. It does not take much time to cram chickens. With one student to help, I can cram 100 birds in half an hour. The machines cost $33 at present as we have to import them, paying freight and duty. They could be manufactured and sold here for about $15 each. They will no doubt be manufactured in this country before very long.

Q. Does it pay to cram them?

Mr. GRAHAM: Yes. I figured that the actual profit on these birds was about 12 cents each. In selecting birds for fattening purposes you should bear in mind the same principles that you have in connection with feeding beef cattle. You do not want a narrow-chested bird, but one that is wide at the shoulders with a good sized thigh, and a breast that will cut well. You can breed a flock of chickens for anything you like. For our Canadian trade, a meaty bird with a medium amount of fat is required, weighing four pounds and upwards. If you have that you can sell them like hot cakes in Toronto at 12 cents per pound. I have an offer of 10c. per pound from Montreal f.o.b. here for birds of this description. They will take all I can ship. Ten days is sufficiently long to cram.

Q. Do you feed the potatoes peeled?

Mr. GRAHAM: No; skin and all.

Q. Do you feed them milk?

Mr. GRAHAM: We give them water to drink but the milk is supplied in the feed.

Q. How long do you starve before killing?

Mr. GRAHAM: For thirty-six hours.

Frank C. Hare, Department of Agriculture, Ottawa.

Fattening chickens and preparing them for market is the most important branch of commercial poultry culture. On the Canadian markets, and more so on the British markets, well fatted chickens are greatly preferred to those not fatted. Fattening chickens improves the quality of flesh, increases the quantity of flesh, and with very slight gain in the weight of bone.

The Commissioner of Agriculture, Prof. Robertson, conducted an experiment with 101 chickens which he bought on the Ottawa market. He selected from these, three average chickens, killed, dressed and cooked them, and found that the meat of the three chickens weighed 2 lbs. 6 ozs., and the bones, 1 lb. 2 ozs. The remaining 88 chickens were then fatted in crates for five weeks, and at the end of that time, three of the average chickens were killed, dressed, and cooked. The meat from these three fatted chickens weighed 7 lbs 6 ozs., and the bones 1 lb. 11 ozs. This experiment showed with the fatted chickens, a gain in choice, edible meat of five pounds, and a gain in weight of bone of only 3 ozs. for each chicken. Moreover, this does not take into consideration the improved quality of the flesh of the fatted chicken. The mixture of oats and skim milk gives a very fine-grained, white flesh, whilst the tallow fed during the last days of the fattening, increases the juiciness of the meat.

It is a very poor policy on the part of the buyer to purchase chickens that are not fatted, and it is also poor policy on the part of the farmer to place lean chickens on the market. Chickens can be fatted profitably by farmers not having had previous experience. Mr. Theo. S. Brant, who operated the Dominion Department of Agriculture poultry fattening station at Whitby, Ont., had not given special attention to poultry. He fatted 134 chickens for his first lot. These chickens gained in four weeks feeding 2 lbs. each, at a cost of 5.1 cents per lb. His next lot gained in high crates, 2 lbs. 7 ozs each, at a cost of 5.3 cents per pound. Mr. Brant is now fattening a third lot of chickens. This shows what can be accomplished by farmers or poultrymen careful in their work. Experiments conducted by Bondville, Que., Government fattening station, and by Truro, N.S., fattening station proved that chickens fatted more cheaply in fattening crates than when fatted in the regular ground pens used by poultrymen. Different lots of chickens at these stations fatted on a mixture of ground oats and skim-milk, made a larger and more profitable gain than other lots fed on ground oats, mangels and water. The pullets fed on the meal, mangels and water mixture commenced to lay, showing this ration to be more adapted to egg-formation than fat. The mangels were cut up in a vegetable cutter, and were in weight about one-fifth the weight of the meal fed.

The best feed mixture contains by weight, nearly twice as much milk as meal. The milk acts as a laxative. Ground oats are too heating to be fed alone.

Q. Do they want large or small birds in England?

Mr. Hare: The British market wants large birds.

Q. At what age should a chicken reach three pounds?

Mr. Hare: At about three months. Poultry experiment stations have been located by the Dominion Government in all parts of Canada. A large number of additional stations are contemplated. It is also the intention to take up winter work at these stations. The plan is to make them model stations where the farmer can obtain all the information he requires in connection with rearing and fattening chickens for the British market. Through these stations the Department will reach farmers who could not be helped in any other way. The Government has an agent at Liverpool, Mr. Grindley, who handles the chickens shipped, sees that they are sold on a reliable market, and that returns are made to Canada. The Dominion Department of Agriculture is prepared to give the private individual who wishes to ship fatted birds to England, the benefit of these advantages. We have always had a good market in England for our chickens, and we do not want it to go down. Some shippers are sending poor stuff, and if this is continued it will do great harm to our reputation in market poultry there. In regard to the class of birds that are most suitable for export to England. I will tell you the qualifications sought for in the best English table poultry; plumpness of breast, whiteness of skin, smallness of bone, fineness of flesh, absence of offal.

The Barred Plymouth Rocks and the White Wyandottes have fatted very profitably, and given the best satisfaction at the Government fattening stations. The Live Stock Commissioner, Mr. Hodson, was pleased with the plump appearance, when fatted, of cross bred chickens from a Dorking male and Barred Rock female. Either of these breeds suit the best English buyer. The chickens can, moreover, be quickly disposed of on our Canadian market, whilst the early pullets are the best layers we have during the winter months.

Q Do you keep the feed always before the birds in fattening from the trough?

Mr. HARE: No; we feed them twice a day, and remove any feed left in the trough when through eating.

MR. GILBERT, EXPERIMENTAL FARM, OTTAWA.

The farmer's aim must be to produce a superior quality of poultry. The only way to do that is to begin right. You must have the correct type of bird—birds that make large chickens. Plymouth Rocks and Wyandotts you will find suitable. Then you must raise your chickens at the proper season. You will find that you can raise your chickens earlier with a incubator and in larger numbers. They also have the advantage of being of uniform age, which is important. You must remember that the critical period of the chickens life is the first five weeks. You cannot have a large chicken if you neglect it at that time. You must give your chickens particular care during that period. That is well understood in England, where there is a maxim that a chicken that is allowed to become stunted during the first five weeks, never recovers. You must begin at the very beginning in order to get large chickens and begin right Most of the farmers in this country require elementary teaching. Get the right breeds, and when you get the chickens, feed them so that they will make rapid growth from the start. The waste of the house and the farm mixed with meal will give you the best results.

Mr. FRASER: Have you had any experience with chicken cholera?

Mr. GILBERT: There is no such disease as chicken cholera in this country, although there is a trouble that somewhat resembles it, and is sometimes mistaken for it..

POULTRY RAISING.

BY JOSEPH POOLE, JR, LAMBETH.

In making a report of the system of the raising and care given our Barred Plymouth Rocks, I would say we keep about 75 birds. Fifty of these are over one year; the remainder were under a year. By this way of killing twenty five of the oldest every year, we have always a young flock of hens.

We try to have our hens commence to set about the first of March, as we find if set earlier than this the per cent. of chicks that hatch is very small. By looking well after our eggs so as not to get them chilled, we get a pretty fair brood. Our plan is, if possible, to set two or three at the same time, so that when they hatch we can put all the chicks with one hen and set the others again. In this way a hen can take care of thirty or forty chicks. With a little care, a hen will set for six weeks, and sometimes for nine weeks if she and the nest are kept clear of lice. We prefer a shallow box about six inches deep and twelve or fifteen inches square, on the floor of the hen house if possible. Should a hen break an egg in the nest when sitting, the others should be washed with a little warm water as dirty eggs seldom hatch.

THE CARE OF CHICKS. Give the hen a coop, and set it outside on warm days to allow the little ones their liberty. A few bread crumbs the first day or two, and some small or cracked wheat is the very best food, as it seems to keep them healthy, and every farmer has more or less of it. After a couple of weeks the chicks will commence to take larger grain. Avoid wet or sloppy food, and, if possible, keep them from rotten apples, which are very injurious. When about the size of partridges, take the hen away and the little ones will naturally go to their coop every night. This should be closed up and made safe from rats, skunks, and other vermin. The hen soon starts to lay again. Always give the hens their liberty when laying, as they seem to give more eggs than when

confined in the hen houses ; also, by allowing them their liberty, they gather a good share of their food, and they seem to know what food is necessary to make eggs. By this method we manage to raise about four hundred of them every year, for dressing for market.

Our plan of dressing is to starve for twenty-four hours ; then kill by slitting the roof of the mouth with a pen knife, penetrating the brain ; then just back of the ears cut the jugular vein. Allow them to hang for a few minutes to drain the blood out, and after washing the head and feet the chick is ready to pluck. This should be done dry. Our style of trussing is to fasten a string securely around each foot ; fold the feet back by the side of the breast, pass the strings down between the breast and wings and tie together on top of the back. Take another string, pull through the legs and tie the hocks together, pass the string around the tail and secure firmly. This gives your fowl a neat, plump appearance, and you have it ready for the market. Our market is London, and by this plan of management we can make our chicks average about 60 cents per pair, and have them all away before Christmas.

A REVIEW OF SOME OF THE POULTRY CLASSES AT THE ONTARIO SHOW, DECEMBER, 1900.

By S. Butterfield, Windsor.

Light Brahmas were very numerous, and there were some exceptionally good birds. The first prize cock had only one fault, and that was a little shortness of leg, but the hackle, wing and tail were nearly perfect in color, especially so in flights. The second prize cock was rather a nice-shaped bird, but lacked the grand glossy black in hackle wings and tail. The third prize cock had lots of good black about him, but was in poor show condition. The balance of the class was only medium. Hens were only middling specimens. While some were large and good-shaped they were miserably bad in flight color and very poor in tail coverts. The best looking hen had white flights or nearly so, and three fourths of her tail was white, making her almost worthless as an exhibition hen and worthless as a breeder. The first prize hen was not through moulting. She had much the best wing, while the second was rather showy, but much poorer in flights and tail shape. The third prize hen was a very good one but not in show condition.

The first prize cockerel was grand in neck, wing and tail, much the best at his age. Second prize cockerel was larger, but carried his tail too much on the squirrel-tail order. A Brahma's tail, male or female, should be carried pretty much in line with the saddle, and the tail be well spread and well filled in behind with soft curling feathers rising tolerably upright. The third prize cockerel was sick, but may make a better bird when further developed. The rest of the class was almost too young to give an opinion upon. Pullets.—First, rather a good pullet with about a perfect Brahma tail both in shape and color. Second pullet better in neck hackle, but not so clear on back nor so good in shape and color of tail. The balance of the class were all too young to show at their best.

Dark Brahmas. First cock, a really grand-shaped, good-colored bird, not so large as one would wish, but what there was was of a quality of a very high order. Second cock, fairly good in flights and fluff. Third cock, large and quite showy, but the big patch of white in fluff sadly spoiled his appearance. Hens were probably the best ones ever shown in Canada with not much difference between the first, second and third winners. Of course some were not in show shape, but three hens that did not get a place would have been very creditable if the winners had been away. The first prize cockerel was well grown, but not as good as the best cock. The second and third cockerels wanted about six weeks more to show to advantage. In fact I may say all the cockerels excepting the first were too young to show. Pullets were a grand class, first and second winners were clean, well pencilled and especially good on cushion where so many dark Brahma females fail. Third and fourth were very good. The balance were too young for show.

All classes of Cochins were well filled. Buffs were most numerous. First cock a little long on leg and a little higher in color than most people like, but apart from that he was a grand shaped Cochin. The second was better in color but lacked finish. Third

and fourth were not so large or so good in shape. The first prize hen was too high in color, but outside of that she was well-formed. The second was a very similar hen, but longer in the neck and not so good on the cushion. The rest of class were pretty good. The first cockerel was rather a nice bird, very broad, and when his tail is in at its full length will be quite a good bird. The second cockerel was nice, but on the small order with not bone enough. The third cockerel was a good promising bird. The first prize pullet was a pretty, well developed bird, not so good in color as second pullet, but she had the advantage of being almost fully developed. The second pullet will probably make the best when she is two or three weeks older. The third pullet was high in color, but of a typical shape. The balance of class was medium good. The first prize Partridge Cochin cock was rather leggy but of grand, bright, rich coloring. He was an easy winner. The second was a good cock, but not far enough out of the moult. The third was a fairly good bird. The first prize hen was good, but she would be much better if her foot feathering was heavier. The second hen was heavier on feet but not so good in color or pencilling. The second lacks pencilling on cushion. The first prize cockerel was a really grand colored bird and will make a show bird when developed. The second cockerel was very poor in neck color. The third cockerel was of a nice color, but too young for present company. The first pullet was quite a good one, the second very fair, while the third was middling.

White Cochins. The first cock will be a good bird, but was not far enough through the moult. The first hen was nice, but too small for strong company, and probably would have to give way to the two much larger hens if they had been in full feather. First, second and third cockerels were all well-grown birds and easy winners amongst their companions. First and second pullets were both really good ones, and almost fit for the best company. The rest were only medium

Blacks. The first cock was rather a nice bird in the best of feather, while the second and third were not far enough out of the moult as against the first cock. Hens made a fairly good class, but I have seen better at our Ontario shows. The first cockerel was quite a swell and good in color. Second and third cockerels were not far enough advanced. The first pullet was quite a good shaped Cochin, but she lacks the glossy sheen so desirable. The second pullet was quite glossy, but not far enough developed. The third pullet had not much lustre on her, but was a fairly good one.

Game and Game Bantams. There were some remarkably good birds in these classes. The first Black Red cock was a really good bird, and if his neck hackle had a little more lemon in it he would be better for it. Second cock not so compact a bird, but a very good one The third was the best colored of the three, but his worst fault was too much length and looseness in feather. There were several more good cocks but they lacked in size. Hens.—The first hen was grand in color and of good, large size and elegant shape. The second hen ran her close, only she is not so good in color. The third hen was also a very good one.

Brown Reds. First cock was a grand top-colored bird, but not so good as first cockerel. This latter is fit for the strongest company. The females were remarkably fine in color and well-grown; not often do we find so many good colored Brown Reds.

Duckwings. The first cock was a really well finished bird, but I would like him better if he were bigger. The second cock was rather a stylish bird, but not quite high enough in stature. The third was a little off in wing shoulder color, but by no means a poor bird. The first and second prize hens were very close. The third hen and another unplaced hen were also very good ones. Among the cockerels the best bird was too sick to be placed at the top. The first cockerel was too small and had not bone enough. Pullets were only fairly good.

Pyles. The first cock was easily the best bird in that class, a grand, clean colored bird, and good in style. The second was not quite so clean, but still quite a good bird. The third cock lacks size and has a little too much loose feather on his neck hackle, and is a little off on back color, but the other parts of the bird were very good Hens were a very strong class also, and, taking this class of games, it contained most of the best birds.

Indian Games. The first cock was about perfect in color and shape. He only lack size to be quite a hard one to beat. The second was good in color but not so short in feathe The third cock was a good bird but had too much red on fluff. The first hen was sho

in leg but grand in shape and color, and, like the first cock, would be better if she had more size. The second hen was very bright in color, and would probably have been first but for the male bird beating her about the pen which made her afraid to show herself to the best advantage. In cockerels the first was a grand stylish fellow, the second not so nice in shape and too leggy, while the third was rather a good bird but too long in the leg and lacked the shoulder of the first prize cockerel. The first pullet was a gem of the highest order, and, if larger, just fit for the best of company ; the second followed close up, and the third was also a good one. In fact take this class as a whole it was the best class of Indian Games I ever met in Canada.

Buff Leghorns. The first cock was probably the best of the cocks and cockerels, of good size and very even in color ; the second was not so good in shape or finish. The first cockerel was of rather a nice golden color, but not so large as the second cockerel ; of the latter and several other cockerels, while their plumage was not high in color, it was very deficient in lustre, and breeders should try to get lustre on the plumage, for it is a great defect on any Buff male, though they may be light buff in color, not having any gloss on the feathers. It makes the feathers look as if the birds are sick. Hens and pullets were very strong classes. The first hen and first pullet were fit to win in almost any company. They were very uniform in color, and of quite glossy plumage. I noticed two good-sized hens very even in color, but the bloom had all gone off the feathers. In Bantams, other kinds, very good birds got all the prizes, not a middling good one getting a first prize.

By L. G. Jarvis, Montreal, Que.

I must first congratulate the officers and directors of the Ontario Poultry Association on the great success of this exhibition. Both in quantity and quality it might be considered the best exhibition of poultry ever held under the auspices of the Ontario Poultry Association.

The building in which the exhibit was placed was all that could be desired with possibly one exception, that is, not sufficient light in all parts of the hall. This could be overcome by the addition of a few skylights.

Barred Rocks. There was a grand exhibit of Barred Rocks, over one hundred and forty being on exhibition. We look upon this variety of fowl as being the most popular of all standard varieties, and for a general purpose breed none is superior to this one. They have good size, clean bright yellow legs and skin, are large bodied and produce an excellent quality of meat. They mature rapidly and fatten quickly for market, are good egg producers and hardy vigorous birds. In my opinion, this is the ideal bird for the farmers of this country ; in fact, the best for all who have only room for one breed.

I carefully examined all specimens, both as regards shape and color ; giving preference to shape and size over color. I noticed in males, several specimens with good bone, large shanks and deep bodies ; yet they failed in breast shape. Others with well developed breasts had narrow backs, and very much pinched at tail. An ideal shaped rock should have a broad back, medium in length, with a breast, broad, deep, and well rounded.

Color of Plumage. Body color should be a bluish grey, barred with narrow parallel lines of dark blue to stop short of a positive black, the shade of surface colors to be nearly uniform throughout. In under color we prefer light to muddy or "cottony" under color. I noticed a few females with a very nice surface evenly barred, yet with "cottony" under color and wing flights or primaries, without the slighest barring. We also handled several very fine pullets, barred to the skin and the proper color ; yet several black feathers appeared in different sections of the body. I presume some of those pullets have been shown, and after removing those off colored feathers, have won at later shows, which accounts in a great many instances for the difference in the judgment of different judges. I would like to see more prizes given for this variety as the competition is generally very keen, and many grand birds are left out without even a "Commended" ribbon. I would suggest that at least three money prizes be given, and a "Very Highly Commended," "Highly Commended" and a "Commended" ribbon be given. Even a mention in such a strong competition in this class as it was at this show, would be very much appreciated by the exhibitors, which would show the standing of the birds on exhibition.

White Rocks. A nice lot, and a great improvement over last year in size and shape of body. First, second and third cocks were a good size; first a little coarser in comb; hens extra fine all through, both in shape and color. First cockerel was a very large, well developed bird, with large bone and sound color, neat head and comb. Second when matured, will make a grand bird; hardly as broad in the back as first. Third was also a fine bird. The first pullet was nice all over and in fine show shape; second hardly as good in breast shape, yet good in color; third, good color, and when fully developed will make a typical Rock in shape. Forty-five birds were shown,—a hot class.

Buff Rocks. A big class,—about sixty birds were shown, all in good condition. First cock was a very good color, nice breast but rather short in back. Second, was a darker buff, not as good in color of tail. Third was larger but not as even in surface color or as good in shape. Hens were a fair lot. First hen, only fair in color, good shape; second, lighter in surface color; third hen, too light, but good shape and good shanks. First cockerel was a big bird, nice color large and good colored shanks, comb not evenly serrated. Second, large, rather mealy in color, good legs and nice in shape. Third, had good shanks, was fair and even in color, tail hardly furnished. First, neat, mellow buff and nice shape; second, hardly as good in color, large and fairly good shape; third, nice color, will develop into a nice shaped hen.

White Leghorns. A fine class. First cock a clean white in color of plumage and a very fair comb; second, good style, white, light in color of shanks; third, a fair bird, off in comb, and out of show condition. First hen was a good one, grand style; good in beak and leg color; lobes and comb a good shape, also wattles. The second crowded hard for first place, but preferred the first in general symmetry. First pullet, a beauty; Leghorn in shape all over; fit for any competition; other winners also good. First and second cockerels extra fine up on legs, with great shaped tails, good shanks, combs and lobes. Third was also a fine bird, very white, hardly as nice in symmetry as first and second.

Brown Leghorns, Single Comb. A large entry; some very fine birds, yet I have found several hens and pullets very much off in color, mossy on back, "shafty," "cricky" on wing; some of the pullets had more barring than penciling on the backs. First cock, rich in color, a little too much comb, very nice in symmetry, well up on legs. Second was hardly in show condition, yet a fair bird. Third not so good in color. First hen was a grand one, free from shafting, good shape, nice comb and lobes,—an easy winner. Second and third were fair; might be better penciled on the back. First cockerel was a good bird, good shanks, good striping in both saddle and neck hackle; would like comb a little smaller, and hackle in surface color a little darker. Second was a good one, good color, not so nice in symmetry or comb as the first. Pullets good; winners of first, second and third close in many respects.

Rose Comb Leghorns, White and Brown. Both classes were fairly well represented, and extra fine specimens could be seen in both varieties. I see a great improvement in the Rose Combs over previous years, more particularly in shape of comb. We do not see so many with those large Wyandotte combs, and we meet with as good striping in saddle and hackle and as rich in color as in the single comb varieties. Black a fair class; nothing special to mention in this class, excepting that the combs on most all of the males were as large as Minorcas, and serrations the same shape. Too much beef boys! Come down a little in comb. Also give us a little more lustre in color of plumage Look out for color of shanks; bluish color does not go We must have either yellow or a yellowish willow. *Polish*, a great attraction, especially for the ladies, who admire their beautiful plumage and their immense crests or top-knots, as this tuft of feathers was called in our younger days. All varieties were represented, and I might say with two or three exceptions, every bird was well up in standard qualifications.

Silver Dorkings. A really good class,—especially the females—of good size and extra in color. Colored,—not many shown; Whites,—A small entry but extra quality.

Houdans. This variety was not nearly as good as we have seen at the Ontario, although there was some very fine birds on exhibition. The class as a whole, was not up to former years

Turkeys. Anyone who attended the exhibition could not help but admire the turkeys, especially the Bronze; their great size and beautiful lustre of plumage shining like burnished gold, was certainly a sight to look upon and long for Christmas to come. All

specimens in this class I may say were over standard weight. I have asked repeatedly to have the turkey weighed, so that everything else being equal, the judge could give the preference to the heavier specimen. To get at the proper color of plumage, we must either have extra coops to place specimens in when being judged, or more light in the passage where the turkeys are shown. I did my best to place the awards where they rightly belonged, yet if a mistake was made there was certainly an excuse. The light we had where the turkeys were cooped was anything but satisfactory. This certainly was a very hot class both in Brown and White Holland.

Geese, Embden. A very fine class and in fine show condition. Tolouse,—this variety in number hardly up to other years, but in quality very fine. Any Other Variety,—Some very good African shown. While the standard calls for a heavy dewlap, its absence is only a disqualification in cases of absence of knob, as in the Tolouse ; we most certainly prefer the dewlap in aged specimens.

If toys or ornamental geese and ducks are going to be shown, it certainly would be advisable to give a class for them, and not allow them to compete against utility birds. I for one, cannot see my way clear in awarding toys or ornamentals a prize against utility birds.

Ducks. A very fine class indeed ; all varieties you might say, of utility ducks, well represented. We have seen more Pekin birds shown at the Ontario in this class, but the quality was fully up to former years I might say, is was a hot class of Pekins. Some grand Aylesbury birds were shown, and in the pink of condition. Rouens and Cayugas were also good.

RESULTS OF EXPERIMENTS IN FEEDING CHICKENS.

In September, 1900, under the ausipices of the Ontario Poultry Association and the Farmers' Institutes of Ontario, it was decided to conduct a series of chicken experiments to ascertain, if possible, what is gained by the proper fattening of fowl for the market. Sixty-four chickens divided into four lots of sixteen each, were first experimented with. It was endeavored to have each chicken weigh from three to three and a half pounds. One lot was handled as ordinary farm chickens, being allowed to run outside and get all the exercise they wished to take. The second lot was fed in a box-stall or shed, the birds having no out-door exercise ; the third in crates, such as were introduced by Prof. Robertson ; and the fourth lot in similar crates, but during the last ten days of the experiment fed by means of the cramming machine. The chickens were all fed similar feed, the food used being one part each of cornmeal, oats, and barley. During the last ten days tallow was also fed. The feed for the crammer was ground to powder and mixed with skim milk.

Owing to the bad season for early hatched chicks, the birds procured for the first experiment were not as good as they might have been. At the end of seven days the entire lot had only gained four and a half pounds ; and the reason for this was partially due to the fact that the chickens were too young and small to fatten, and the hot weather was against them, cooped up in small quarters.

For the first three weeks the birds did not feed well ; the lot in the shed remaining at nearly a standstill. They developed feather-plucking soon after the commencement of the experiment. The two lots in the crates also contracted the habit ; due probably to the fact that too much corn was being fed, as it is very heating. At the end of the fifth week the cramming machine was used, and the chickens seemed to thrive better and ceased plucking feathers. The chickens which were running outside seemed to grow well, but did not fatten.

First Experiment.

The result of the first experiment is as follows.—

Lot No. 1, Box Stall.

Weight at beginning of experiment	35½ lbs.
Weight at close of experiment (7 weeks)	49 "
Gain in weight	13½ "

Cost of chickens Lot No. 1.

Live weight, 35½ lbs. at 10.3c	$3 66
Food, 147 lbs	1 40
	$5 06
Sold for (43 lbs. at 12 1-10c net)	$5 20
Gain	.14

Lot No. 2. Crammed.

Weight at the beginning of the Experiment	41¾ lbs.
Weight at close of Experiment (7 weeks)	69 "
Gain	27¼ lbs.

Cost of chickens. Lot No. 2

Live weight, 41¾ lbs at 10 3c	$4.30
Food, 204 lbs	1.93
	$6 23
Sold for (56 lbs. at 11 2/10 net)	$6 40
Gain	.17

Lot No. 3. Crates.

Weight at beginning of experiment	40 lbs.
Weight at close of experiment (7 weeks)	59 "
Gain	19 lbs.

Cost of chickens. Lot No. 3.

Live weight, 40 lbs. at 10.3c	$4.12
Food, 196 lbs	1 87
	$5.99
Sold for (58 lbs at 12½c net)	$7 25
Net gain	$1 26

Lot No 4. Loose.

Weight at beginning of experiment	37¼ lbs.
Weight at close of experiment (7 weeks)	51 "
Gain	15¾ lbs.

Cost of chickens Lot No. 4

Live weight, 37¼ lbs. at 10 3c	$3 84
Food, 171½ lbs	1.63
	$5.47
Sold for (44 lbs. at 12¾c net)	$5 61
Gain	14

At the close of seven weeks' feeding the birds were killed and shipped to the Wm. Davies Co., Limited, Toronto, and they were reported on as follows :

Lot No. 1.—"Chickens were very small and not good, marketable fowl. Weight was from 1¾ to 2¾, and the price obtained was not as good as that for larger chickens. They were fairly plump and the flesh very evenly distributed. Flesh was not a good color, and they were too small."

Lot No. 2.—"A fair lot of birds, but uneven, some too thin and some large and coarse. Most of them, however, were a very good color, but all would have been better of a little longer feeding. The breasts were not plump enough. Customers showed a preference for birds with yellow legs, and all reported them tender and juicy."

Lot No. 3.—"Some of the chickens in this lot were too small, and we find it very hard to get a good price for chickens under four pounds. The kinds of chickens in demand at our branch are large framed birds, capable of carrying lots of flesh without much fat."

Lot No. 4.—"Taking the birds as a whole they were a poor lot, and should not have been marketed in such an unfinished condition"

From these experiments it would appear that chickens weighing under three or three and a half pounds are not in condition to fatten properly.

Second Experiment.

The chickens procured for the second experiment, which was conducted on the farm of Mr. D. Drummond, Myrtle, were larger and better for fattening purposes, with the result that the experiment was conducted more satisfactorily. The chickens gained from the first, and at the end of four weeks were ready to market. The same food was used as in the first experiment; also a cramming machine, and the lots were divided in a similar manner. The lot of chickens that ran outside were not as good a color as the others. The chickens fed without exercise were more tender and juicy. The plumper chickens sold more readily; the Rocks not so quickly as the Wyandottes and Dorkings, being more bony.

The result of the experiment is as follows:—

Lot No. 1. Loose.

Weight at beginning of experiment	54 lbs.
Weight at close of experiment (4 weeks)	69½ "
Gain	15½ lbs.

Cost of chickens. Lot No. 1.

Live weight, 54 lbs. at 6.8c		$3.67
Cost of food, 54 lbs. meal		67
		$4.34
Sold for (58 lbs. at 12½c. net)		$7.25
Net gain		$2 91

Lot No. 2, Crates.

Weight at beginning of experiment	59 lbs.
Weight at close of experiment (4 weeks)	88 "
Gain	29 lbs.

Cost of chickens, Lot No. 2.

Live weight, 59 lbs. at 6.8c		$4 01
Feed, Meal 122 lbs	$1 46	
" Milk 132 lbs	33	1 79
		$5 80
Sold for (71 lbs. at 11.2c. Net)		$7 95
Net Gain		2 15

Lot No. 3, Box Stall.

Weight at beginning of experiment	52 lbs.
Weight at close of experiment (4 weeks)	74 lbs.
Gain	22 lbs.

Cost of chickens, Lot No 3.

Live Weight, 52 lbs. at 6.8c		$3 53
Feed, Meal 122 lbs.	$1 46	
" Milk 132 lbs	33	1 79
		$5 32
Sold for (60 lbs. at 12c. Net)		$7 20
Net Gain		$1 88

Lot No. 4, crammed.

Weight at beginning of experiment	69 lbs.
Weight at close of experiment (4 weeks)	110 lbs.
Gain	41 lbs.

Cost of chickens, Lot No. 4.

Live Weight, 69 lbs at 6.8c		$4 69
Feed, Meal 139 lbs.	$1 99	
" Milk 174 lbs.	43½	$2 42½
		$7 12
Sold for (85 lbs. at 14c. Net)		$11 90
Net gain		$ 4 78

Of this shipment the buyers remarked as follows:

Lot No. 1.—"Fair quality; color of flesh not very good. Chickens sold for 12½c. per lb., but if fowl had not been so scarce would not have brought so much. They were too small. Large birds look well and are always in demand."

Lot No 2.—"Color of flesh very good; quality good. Not so clean as No. 1. Chickens were above the average that we buy for sale. The stock was very fine and my customers seem very well pleased with them. The only complaint was the abundance of fat on the back and just behind the legs. The yellow legs seem to have the preference as they were taken first. One or two of the birds were rather thin."

Lot No. 3.—"Very fair samples; a first-class lot. The majority were a good size, nice and plump, and flesh a good color. They gave good satisfaction."

Lot No. 4—"Very good; legs good; the best lot; color of flesh very good."

"Good marketable fowl and would always command a good price. They were properly starved and looked fresh. Flesh was a very nice color. Both the white and yellow skin were in some parts almost transparent, which showed good feeding. Legs were very clean and gave a good appearance to the fowl. There was perhaps too much fat on the inside. The price we got was about top notch, and can only be had for real choice birds, and we believe a good trade could be built up with this class of birds."

Third Experiment.

A third experiment consisting of seventy-three birds was started at London immediately after the close of the first. They were a good average lot, and ate the food much better than those in Experiment No 1; food and conditions being similar. At the end of the third week the crammer was used on the chickens in one of the crates,—lot No. 1. Mr. Richard Oke, who had the experiment in charge, stated that if the chickens which were running loose had received the same treatment as lot No. 1, for the last ten days of the experiment, they would have made more gain per chicken than those in lot No. 1;

for in the first three weeks of feeding they seemed to develop large frames, due, no doubt, to the full range they had. If they had then been put up and crammed, being hardy and strong, they would have stood more forcing. The results are as follows:

Lot No. 1, crammed.

Weight at beginning of experiment	70 lbs.
Weight at close of experiment (4 weeks)	106½ lbs.
Gain	35½ lbs.

Cost of chickens, Lot No. 1.

Live weight, 70 lbs. at 6.7c	$4 69
Food, 150½ lbs	1 35
	$6 04
Sold for (85½ lbs. at 11½c)	9 83
Gain	$3 79

Lot No 2, crates.

Weight at beginning of experiment	75 lbs.
Weight at close of experiment (4 weeks)	93¼ lbs.
Gain	18¼ lbs.

Cost of chickens, Lot No. 2.

Live weight, 75 lbs. at 6 7c. per lb	$5 02
Food, 125½ lbs	1 13
	$6 15
Sold for (70 lbs. at 11½c. net)	8 05
Gain	$1 90

One chicken in this lot died during the experiment.
The proportion of this chicken should be deducted and so stated.

Lot No. 3, shed.

Weight at the beginning of the experiment	64 lbs.
Weight at close of experiment (4 weeks)	67½ lbs.
Gain	3½ lbs.

Cost of chickens, Lot No. 3.

Live Weight, 64 lbs. at 6.7c	$4 28
Food, 112 lbs	76
	$5 04
Sold for (47 lbs. at 12½c. net)	5 88
Gain	84

One chicken in this lot died during the experiment.
The proportion of this chicken should be deducted and so stated.

Lot No. 4, loose.

Weight at beginning of experiment	60 lbs.
Weight at close of experiment	75½ lbs.
Gain	15½ lbs.

Cost of chickens, Lot No. 4.

Live weight, 60 lbs. at 6 7c	$4 02
Food, 112 lbs	1 01
	$5 03
Sold for (65 lbs. at 12c)	7 80
Gain	$2 77

The following remarks will testify as to the result of this experiment :

"The poultry from London this week was a decided improvement over the previous shipment. There was not any perceptible difference between the four batches, except between lots 1 and 2 ; the former being very fat but not sufficiently so to claim any preference ; the latter were very nice birds, rather more proportionate than the others. The flesh of all the birds was nice and clear. Some sold for a little more than others, but it was owing to their superior quality, the reason being the decline in price of poultry generally."

"On the whole, I would consider these a fair average lot of chickens. Flesh is firm and of a nice color. Some in lot No. 2 were very heavily laden on the inside with fat, otherwise they were very fine chickens. Lots Nos. 3 and 4 were just about a good average."

Further Experiments.

Two more experiments were conducted, consisting of one hundred and twenty-eight chickens. These experiments only lasted four weeks, and at the end of that time the chickens were taken to the Provincial Winter Fair, which was held at Guelph, December 11th to 14th, 1900, where they were used as illustrations of the different methods of feeding. During the time of the fair, the chickens were crammed twice a day. A number of the birds were used in a killing and plucking competition open to farmers' sons and daughters only, and these with the remainder of those in the experiment were shipped to Toronto and sold at the various stores of the Wm. Davies Company at an average of 11c. per lb.

Cost of chickens (225 lbs. at 6.3c)	$16 00
" " (274 lbs. at 5 9c)	16 00
Total cost	$32 00
Sold for (479 lbs. at 11c)	52 69
Gain	$20 69

Of this lot the Wm. Davies Company writes :

"Re chickens received from Provincial Winter Fair, Nos. 3 and 0 are very choice, plump, uniform birds ; a good color, nice medium size, and will sell readily for 12½c. per lb. The balance, Nos. 1, 2 and 4, are just fair quality, the majority being thin and poor color, and will realize about 10c. per lb.

"Plump birds, weighing from 3½ to 5 lbs. are most in demand. Very large birds are not so desirable."

There was no great demand for chickens at this time, people preferring turkeys.

From these experiments it will be seen that the chickens which were fed in crates and crammed during the last ten days made the greatest gain in weight during each of the experiments, and they also sold at a higher price. Those fed in crates but not crammed, made the next best gain in weight.

PRIZE LIST.

Brahmas—Light.

Cock.—1st, C. B. Gould; 2nd, Wyatt; 3rd, Sage; 4th, Sherwood.
Hen.—1st, C. B. Gould; 2nd, Sherwood; 3rd, C. B. Gould.
Cockerel.—1st, C. B. Gould; 2nd, Sheridan; 3rd, Thomson.
Pullet.—1st, Thorpe & Scott; 2nd, C. B. Gould; 3rd, Thomson; 4th, Sheridan.
Special for best collection, C. B. Gould.

Brahmas—Dark.

Cock.—1st, Langelier; 2nd, Garside; 3rd, Sage.
Hen.—1st, Thorpe & Scott; 2nd, Langelier; 3rd Sage.
Cockerel.—1st, Langelier; 2nd, Thorpe & Scott; 3rd, Thorpe & Scott.
Pullet.—1st, Thorpe & Scott; 2nd, Thorpe & Scott; 3rd, Langelier.
Special for best collection, Sage.
Special for best pullet, Thorpe & Scott.
Special for best pair, Langelier.

Cochins—Buff.

Cock.—1st, Stewart; 2nd, Stewart; 3rd, Wyatt.
Hen.—1st, Wyatt; 2nd, Stewart; 3rd, Emrick.
Cockerel.—1st, Stewart; 2nd, Wyatt; 3rd, Stewart; 4th, Stewart.
Pullet.—1st, Wyatt; 2nd, Stewart; 3rd, Stewart; 4th, Wyatt.
Special for best pair of chicks, Wyatt.
Special for best collection, Stewart.
Special for best cock, Stewart.

Cochins—Partridge.

Cock.—1st, A. Bogue; 2nd, McDonnell; 3rd, Latta.
Hen.—1st, Oke; 2nd, A. Bogue; 3rd, McDonnell.
Cockerel.—1st, Oke; 2nd, Wyatt; 3rd, A. Bogue.
Pullet.—1st, A. Bogue; 2nd, Oke; 3rd, Wyatt.
Special for best pullet, A. Bogue.
Special for best collection, A. Bogue.

Cochins—Black.

Cock.—1st, Emrick; 2nd, McNeil; 3rd, McNeil.
Hen.—1st, McNeil; 2nd, McNeil; 3rd, Emrick.
Cockerel.—1st, McNeil; 2nd, Latta; 3rd, McNeil.
Pullet.—1st, Latta; 2nd, Latta; 3rd, McNeil.
Special for best cock, Emrick.
Special for best cockerel, McNeil.

Cochins—White.

Cock.—1st, McNeil; 2nd, McNeil.
Hen.—1st, Emrick; 2nd, McNeil; 3rd, McNeil.
Cockerel.—1st, Latta; 2nd, Latta; 3rd, Latta.
Pullet.—1st, McNeil; 2nd, McNeil; 3rd, Latta.
Special for best collection, McNeil.
Special for best pair, McNeil.

Langshans—Black.

Cock.—1st, McCurdy; 2nd, T. H. Scott; 3rd, Karn.
Hen.—1st, T. H. Scott; 2nd, Karn; 3rd, McCurdy.
Cockerel.—1st, McCurdy; 2nd, McCurdy; 3rd, McCurdy.
Pullet.—1st, McCurdy; 2nd, Karn; 3rd, Scott.
Special for best hen, Scott.
Special for best collection, McCurdy.

Langshans—A. O. C.

Cock.—1st, Karn; 2nd, Burn.
Hen.—1st, Burn; 2nd, Karn.
Cockerel.—
Pullet.—1st, Karn.
Special for best collection, Karn.

Plymouth Rocks—Barred.

Cock.—1st, Lake; 2nd, Snyder; 3rd, Bennett; 4th Lake.
Hen.—1st, McCormick & Son; 2nd, Lake; 3rd, Bennett; 4th, Porteous.
Cockerel.—1st, McLoud; 2nd, McLoud; 3rd, Cosh & Co.; 4th, Barber.
Pullet.—1st, McLoud; 2nd, Porteous; 3rd, Cosh & Co.; 4th, McLoud.
Special for best cock, Lake.
Special for best shaped cockerel, barred, white or buff, McLoud.
Special for best hen or pullet, barred, white or buff, Lake.
Special for best shaped cock, Bennett.
Special for best pair, cockerel and pullet, Barber.
Special for best pair, cock and hen, Sloan & Scrimgeour.
Special for best collection, Wray Bros.

PLYMOUTH ROCKS—WHITE.

Cock.—1st, Kirby; 2nd, Rice; 3rd, Foster.
Hen.—1st, Rice; 2nd, Foster; 3rd, Foster; 4th, Rice.
Cockerel.—1st, Wallace; 2nd, Foster; 3rd, Rice; 4th, Rice.
Pullet.—1st, Foster; 2nd, Wallace; 3rd, Rice; 4th, Foster.
Special for best pullet, Foster.
Special for best cock or cockerel, Wallace.
Special for best pair, Rice.

PLYMOUTH ROCKS—BUFF.

Cock.—1st, McKay; 2nd, T. H. Scott; 3rd, Norris.
Hen.—1st, T. H. Scott; 2nd, Readwin; 3rd, McKay.
Cockerel.—1st, Stewart; 2nd, Jonson; 3rd, T. H. Scott; 4th, Stewart.
Pullet.—1st, Jonson; 2nd, Parsons; 3rd, Foster; 4th Foster.
Special for best cock or cockerel, McKay.
Special for best collection, T. H. Scott.

WYANDOTTES—GOLDEN.

Cock.—1st, Wray Bros.; 2nd, Magill; 3rd, Graham.
Hen.—1st, Magill; 2nd, Wray Bros.; 3rd, Graham.
Cockerel.—1st, Wray Bros.; 2nd, Magill; 3rd, Sanders; 4th, Magill.
Pullet.—1st, Magill; 2nd, Wray Bros.; 3rd, Wray Bros.; 3th, Daniels.
Special for best cock or cockerel, Wray Bros.

WYANDOTTES—SILVER.

Cock.—1st, Wray Bros.; 2nd, Wray Bros.; 3rd, Wray Bros.
Hen.—1st, Meyer; 2nd, Wray Bros.; 3rd, G. Bogue.
Cockerel.—1st, Auld & Auld; 2nd, Meyer; 3rd, G. Bogue.
Pullet.—1st, Meyer; 2nd, Wray Bros.; 3rd, Wray Bros.
Special for best collection, Wray Bros.

WYANDOTTES—BLACK.

Cock.—1st, McDonnell; 2nd, Kiley; 3rd, Oke.
Hen.—1st, McDonnell; 2nd, McDonnell; 3rd, Kiley.
Cockerel.—1st, Kiley; 2nd, Kiley; 3rd, Wedgery.
Pullet.—1st, G. Bogue; 2nd, Oke; 3rd, Kiley.
Special for best collection, Kiley.

WYANDOTTES.—BUFF.

Cock.—1st, Cosh & Co.; 2nd, T. H. Scott; 3rd, Groom.
Hen.—1st, Cosh & Co.; 2nd, T. H. Scott; 3rd, Groom.
Cockerel.—1st, T. H. Scott; 2nd, T. H. Scott; 3rd, Gibson; 4th, T. H. Scott.
Pullet.—1st, T. H. Scott; 2nd, T. H. Scott; 3rd, Southcott & Bartlett; 4th, Cosh & Co.
Special for best hen, Cosh & Co.
Special for best cockerel, T. H. Scott.

WYANDOTTES.—WHITE.

Cock.—1st, Massie; 2nd, Moore & Kingsmill; 3rd, Moore & Kingsmill.
Hen.—1st, Massie; 2nd, Kirby; 3rd, G. Poole.
Cockerel.—1st, Moore & Kingsmill; 2nd, Massie; 3rd, Moore & Kingsmill.
Pullet.—1st, Jeffrey; 2nd, T. S. Armstrong; 3rd, Carron.
Special for best cock, Massie.
Special for best pullet, Jeffrey.
Special for best pair, cockerel and pullet, Moore & Kingsmill.
Special for best pair, Massie.

DOMINIQUES.

Cock.—1st, G. Bogue; 2nd, Burn; 3rd, Fink.
Hen.—1st, Burn; 2nd, G. Bogue; 3rd, Fink.
Cockerel.—1st, Luxton; 2nd, G. Bogue; 3rd, Burn.
Pullet.—1st, Burn; 2nd, G. Bogue; 3rd, Fink.

JAVAS—BLACK.

Cock.—1st, Sangreen; 2nd, Oke; 3rd, Burn.
Hen.—1st, Burn; 2nd, G. Bogue; 3rd, Fink.
Cockerel.—1st, Luxton; 2nd, G. Bogue; 3rd, Burn.
Pullet.—1st, Burn; 2nd, G. Bogue; 3rd, Fink.

JAVAS.—A. O. C.

Cock.—1st, Oke; 2nd, Burn; 3rd, Kiley.
Hen.—1st, Oke; 2nd, Kiley; 3rd, Daniels.
Cockerel.—1st, Oke; 2nd, Oke; 3rd, Kiley.
Pullet.—1st, Sangreen; 2nd, Oke; 3rd, Kiley.
Special for best collection, Oke.

LEGHORNS—ROSE COMB WHITE.

Cock.—1st, Burn ; 2nd, Knapp ; 3rd, Masson.
Hen.—1st, Oke ; 2nd, Knapp ; 3rd, Burn.
Cockerel.—1st, Masson ; 2nd, Bell ; 3rd, Bell.
Pullet.—1st, Bell ; 2nd, Masson ; 3rd, Masson.
Special for best collection, Masson.

LEGHORNS—SINGLE COMB WHITE.

Cock.—1st, Rice ; 2nd, Ramsay ; 3rd Graham ; 4th, Wilson.
Hen.—1st, Wilson ; 2nd, Rice ; 3rd, Rice ; 4th, Ramsay.
Cockerel.—1st, Rice ; 2nd, Rice ; 3rd, Ramsay ; 4th, Wilson.
Pullet.—1st, Rice ; 2nd, Ramsay ; 3rd, Wilson ; 4th, Rice.
Special for best pair, Rice.

LEGHORNS—SINGLE COMB BLACK.

Cock.—1st, Daniels ; 2nd, Grundy ; 3rd, G. Bogue.
Hen.—1st, G. Bogue ; 2nd, Grundy ; 3rd, Daniels.
Cockerel.—1st, Grundy ; 2nd, Cox ; 3rd, Luxton.
Pullet.—1st, Cox ; 2nd, G. Bogue ; 3rd, Grundy.
Special for best collection, Grundy.

LEGHORNS—ROSE COMB BROWN.

Cock.—1st, Tozer ; 2nd, Southcott & Bartlett ; 3rd, Cadman.
Hen.—1st, Southcott & Bartlett ; 2nd, W. C. Wilson & Sons ; 3rd, Cadman.
Cockerel.—1st, Cadman ; 2nd, Southcott & Bartlett ; 3rd, Southcott & Bartlett.
Pullet.—1st, Sangreen ; 2nd, Sangreen ; 3rd, Tozer.
Special for best collection, Southcott & Bartlett.

LEGHORNS—SINGLE COMB BROWN.

Cock.—1st, Dewar Bros. ; 2nd, Henderson ; 3rd Mueller.
Hen.—1st, Dewar Bros. ; 2nd, G. G. Henderson ; 3rd, Dewar Bros.
Cockerel.—1st, G. G. Henderson ; 2nd, Mueller ; 3rd, Dewar Bros. ; 4th, Mueller.
Pullet.—1st, Mueller ; 2nd, Dewar Bros. ; 3rd, Mueller ; 4th, G. G. Henderson.
Special for best collection, Dewar Bros.

LEGHORNS—SINGLE COMB BUFF.

Cock.—1st, Williams ; 2nd, Dundas ; 3rd, G. Bogue.
Hen.—1st, Dundas ; 2nd, G. Bogue ; 3rd, Berner.
Cockerel.—1st, Spry & Mick ; 2nd, Whillans ; 3rd, Spry & Mick ; 4th, Dundas.
Pullet.—1st, Dundas ; 2nd, Good & Harron ; 3rd, Roos ; 4th, Berner.
Special for best cockerel, Spry & Mick.
Special for best pullet, Dundas.

SPANISH—BLACK.

Cock.—1st, G. Bogue ; 2nd, Burn.
Hen.—1st, G. Bogue ; 2nd, Baskerville ; 3rd, Baskerville.
Cockerel.—1st, Baskerville ; 2nd, Baskerville ; 3rd, Daniels.
Pullet.—1st, Baskerville ; 2nd, Baskerville ; 3rd, Daniels.
Special for best collection, Baskerville.

MINORCAS—BLACK.

Cock.—1st, Minshall ; 2nd, Millard ; 3rd, Minshall.
Hen.—1st, Minshall ; 2nd, Minshall ; 3rd, Minshall.
Cockerel.—1st, Minshall ; 2nd, Minshall ; 3rd, Minshall.
Pullet.—1st, Minshall ; 2nd, Minshall ; 3rd, Minshall

MINORCAS—WHITE.

Cock.—1st, O'Neil.
Hen.—1st, O'Neil ; 2nd, O'Neil ; 3rd, G. Bogue.
Cockerel.—1st, G. Bogue ; 2nd. G. Bogue ; 3rd, O'Neil.
Pullet.—1st, O'Neil ; 2nd, O'Neil ; 3rd, G. Bogue.
Special for best pair, Minshall.

ANDALUSIANS.

Cock.—1st, Cosh & Co. ; 2nd, Cosh & Co. ; 3rd, Cosh & Co.
Hen.—1st, Cosh & Co. ; 2nd, Cosh & Co. ; 3rd, Cosh & Co.
Cockerel.—1st, Cosh & Co., 2nd, Milton & Michelltree ; 3rd, Cosh & Co.
Pullet.—1st, Cosh & Co. ; 2nd, Cosh & Co. ; 3rd, Cosh & Co.
Special for best cock, Cosh & Co.
Special for best cockerel and pullet, Cosh & Co.
Special for best pair, Cosh & Co.

HAMBURGS—GOLDEN SPANGLED.

Cock.—1st, McNeil ; 2nd, Oke.
Hen.—1st, McNeil ; 2nd, Oke.
Cockerel.—1st, McNeil ; 2nd, Oke.
Pullet.—1st, McNeil ; 2nd, Oke.
Special for best collection, McNeil.

HAMBURGS—SILVER SPANGLED.

Cock.—1st, McNeil; 2nd, Oke; 3rd, A. Bogue.
Hen.—1st, McNeil; 2nd, Oke; 3rd, A. Bogue.
Cockerel.—1st, McNeil; 2nd, Oke.
Pullet.—1st, McNeil; 2nd, Oke.
Special for best collection, McNeil.

HAMBURGS—GOLDEN PENCILED.

Cock.—1st, Oke; 2nd, McNeil; 3rd, A. Bogue.
Hen.—1st, Oke; 2nd, McNeil; 3rd, A. Bogue.
Cockerel.—1st, McNeil; 2nd, Oke; 3rd, A. Bogue.
Pullet.—1st, McNeil; 2nd, Oke.
Special for best collection, Oke.

HAMBURGS—SILVER PENCILED.

Cock.—1st, A. Bogue; 2nd, Oke; 3rd, McNeil.
Hen.—1st, Oke; 2nd, McNeil; 3rd, A. Bogue.
Cockerel.—1st, A. Bogue; 2nd, McNeil; 3rd, Oke.
Pullet.—1st, Oke; 2nd, McNeil.
Special for best collection, Oke.
Special for best pair, McNeil.

HAMBURGS—BLACK.

Cock.—1st, McNeil; 2nd, Elliott; 3rd, Oke.
Hen.—1st, Oke; 2nd, McNeil.
Cockerel.—1st, McNeil; 2nd, Oke.
Pullet.—1st, Oke; 2nd, McNeil.
Special for best collection, McNeil.

RED CAPS

Cock.—1st, Kinder; 2nd, Kinder; 3rd, Kinder.
Hen—1st, Daniels; 2nd, Kinder; 3rd, Carroll.
Cockerel.—1st, Kinder; 2nd, Daniels; 3rd, Kinder.
Pullet—1st, Kinder; 2nd, Kinder; 3rd, Kinder.

GAMES—BLACK RED.

Cock.—1st, Oke; 2nd, Troth; 3rd, Field.
Hen.—1st, Crowe; 2nd, Hawthorne; 3rd, Philpot.
Cockerel.—1st, Crowe; 2nd, Crowe; 3rd, Barber.
Pullet.—1st, Philpot; 2nd, Barber; 3rd, Crowe.
Special for best cockerel, Crowe.
Special for best male or female, Oke.

GAMES—BROWN RED.

Cock.—1st, Crowe.
Hen.—1st, Crowe; 2nd, Crowe.
Cockerel.—1st, Crowe; 2nd, Crowe; 3rd, Crowe.
Pullet.—1st, Crowe; 2nd, Crowe; 3rd, Crowe.
Special for best male or female, Crowe.

GAMES—DUCKWING.

Cock.—1st, Goulding & Son; 2nd, Troth; 3rd, Goulding & Son.
Hen.—1st, Goulding & Son; 2nd, Barber; 3rd, Goulding & Son.
Cockerel.—1st, Barber; 2nd, Goulding & Son; 3rd, Goulding & Son.
Pullet.—1st, Barber; 2nd, Goulding & Son; 3rd, Goulding & Son.
Special for best pair, Goulding & Son.

GAMES—PYLE.

Cock.—1st, Crowe; 2nd, Crowe; 3rd, Chamberlain.
Hen.—1st, Crowe; 2nd, Crowe; 3rd, Goulding & Son.
Cockerel.—1st, Vance; 2nd, Crowe; 3rd, Vance.
Pullet.—1st, Chamberlain; 2nd, Crowe; 3rd, Goulding & Son.
Special for best male or female, Crowe.
Special for best pullet, Chamberlain.
Special for best collection of either "Black Red," "Brown Red, or "Red Pyle. Crowe.

GAMES—INDIAN.

Cock.—1st, Modlin; 2nd, Cox; 3rd, Kinder.
Hen.—1st, Parsons; 2nd, Sloan & Scrimgeour; 3rd, Parsons.
Cockerel.—1st, Modlin; 2nd, Cox; 3rd, Parsons.
Pullet.—1st, Parsons; 2nd, Armstrong; 3rd, Parsons.
Special for best male, Sloan & Scrimgeour.
Special for best pair, cockerel and pullet, Parsons.

GAMES—A. O. S. V.

Cock.—1st, Daniels ; 2nd, Burns.
Hen.—1st, Kiley ; 2nd, Daniels ; 3rd, Burns.
Cockerel.—1st, Crowe ; 2nd, Kiley ; 3rd, Goulding & Sons.
Pullet.—1st, Crowe, 2nd, Kiley ; 3rd, Goulding & Sons.

BANTAMS—BLACK RED.

Cock.—1st, Monck ; 2nd, Crowe ; 3rd, Dewar Bros.
Hen.—1st, Crowe ; 2nd, Ferncliffe Bantam yards ; 3rd, Dewar Bros.
Cockerel.—1st, Barber ; 2nd, Barber ; 3rd, Crowe.
Pullet.—1st, Barber ; 2nd, Crowe ; 3rd, Crowe.
Special for best cockerel, Barber.
Special for best hen or pullet, Barber.
Special for best pair, Barber.

BANTAMS—BROWN RED.

Cock.—1st, Barber ; 2nd, Sallows ; 3rd, Ferncliffe Bantam yards.
Hen.—1st, Ferncliffe Bantam yards ; 2nd, Barber ; 3rd, Powell.
Cockerel.—1st, Barber ; 2nd, Ferncliffe Bantam Yards ; 3rd, Powell.
Pullet.—1st, Ferncliffe Bantam Yards ; 2nd, Barber ; 3rd, Powell.
Special for best cock, Barber.

BANTAM—DUCKWING.

Cock.—1st, Ferncliffe Bantam Yards ; 2nd, Barber ; 3rd, Sallows.
Hen.—1st, Ferncliffe Bantam Yards ; 2nd, Barber ; 3rd, Sallows.
Cockerel.—1st, Barber ; 2nd, Colwell & McDonald ; 3rd, Ferncliffe Bantam Yards.
Pullet.—1st, Ferncliffe Bantam Yards ; 2nd, Barber ; 3rd, Sallows.
Special for best collection, Barber.

BANTAMS—PYLE.

Cock.—1st, Barber ; 2nd, Tyson.
Hen.—1st, Monck ; 2nd, Barber ; 3rd, Crowe.
Cockerel.—1st, Crowe ; 2nd, Barr ; 3rd, Barber.
Pullet.—1st, Barr ; 2nd, Barr ; 3rd, Tyson.
Special for best hen or pullet, Barr.
Special for best cock or cockerel, Barber.

GAME BANTAMS—A. O. V.

Cock.—1st, Donovan ; 2nd, Donovan.
Hen.—1st, Donovan ; 2nd, Donovan.
Cockerel.—1st, Donovan ; 2nd, Donovan ; 3rd, Teale.
Pullet.—1st, Teale ; 2nd, Donovan ; 3rd, Donovan.
Special for best cockerel and pullet, Donovan.
Special for best collection, Barber.

BANTAMS—GOLDEN SEBRIGHT.

Cock.—1st, McNeil ; 2nd, Oke.
Hen.—1st, Oke ; 2nd, McNeil ; 3rd, Wells.
Cockerel.—1st, McNeil ; 2nd, Oke ; 3rd, Wells.
Pullet.—1st, Oke ; 2nd, McNeil ; 3rd, Wells.
Special for best collection, McNeil.

BANTAMS—SILVER SEBRIGHT.

Cock.—1st, McNeil ; 2nd, Oke.
Hen.—1st, Oke ; 2nd, McNeil.
Cockerel.—1st, McNeil ; 2nd, Oke.
Pullet.—1st, Oke ; 2nd, McNeil.
Special for best collection, Oke.

BANTAMS—WHITE OR BLACK, ROSE COMB.

Cock.—1st, McNeil ; 2nd, Oke.
Hen.—1st, McNeil ; 2nd, Oke ; 3rd, Readwin.
Cockerel.—1st, McNeil ; 2nd, Oke ; 3rd, Whelstone.
Pullet.—1st, McNeil ; 2nd, Oke ; 3rd, Whelstone.
Special for best collection, McNeil.

BANTAM—WHITE COCHIN.

Cock.—1st, Donovan ; 2nd, McNeil ; 3rd, McNeil.
Hen.—1st, Rankin Bros. ; 2nd McNeil ; 3rd, Emrick.
Cockerel.—1st, McNeil ; 2nd, McNeil ; 3rd, Donovan.
Pullet.—1st, McNeil ; 2nd, Emrick ; 3rd, Donovan.
Special for best collection, McNeil.

BANTAMS—BUFF COCHIN.

Cock.—1st, McNeil ; 2nd, Oke ; 3rd, Powell.
Hen.—1st, Rankin Bros. ; 2nd, Oke ; 3rd, McNeil.
Cockerel.—1st, McNeil ; 2nd, Powell ; 3rd, Oke.
Pullet.—1st, McNeil ; 2nd, Oke ; 3rd, Powell.
Special for best collection, McNeil.

BANTAMS—A.O.V. COCHIN.

Cock.—1st, Kiley ; 2nd, Tozer ; 3rd, Donovan.
Hen.—1st, Kiley ; 3nd, Tozer ; 3rd, Teale.
Cockerel.—1st, Rankin Bros. ; 2nd, Kiley ; 3rd, Kiley.
Pullet.—1st, Rankin Bros. ; 2nd, Kiley ; 3rd, Teale.
Special for best hen and pullet, Kiley.

BANTAMS—WHITE BOOTED.

Cock.—1st, Oke.
Hen.—1st, Oke ; 2nd, Oke.
Cockerel —1st, Donovan.
Pullet.—1st, Oke ; 2nd, Donovan.
Special for best collection, Oke.
Special for best collection White Japanese Bantams, McNeil.

JAPANESE BANTAMS—BLACK TAILED.

Cock.—1st, Oke ; 2nd, McNeil.
Hen.—1st, Oke ; 2nd. McNeil.
Cockerel —1st, Oke ; 2nd, McNeil.
Pullet.—1st, Oke ; 2nd, McNeil.
Special for best collection, Oke.

BANTAMS—POLISH.

Cock.—1st, McNeil ; 2nd, Oke.
Hen.—1st, Donovan ; 2nd, McNeil ; 3rd, Oke.
Cockerel.—1st, Donovan ; 2nd, McNeil ; 3rd, Oke.
Pullet.—1st, McNeil ; 2nd, Oke.
Special for best collection, McNeil.
Special for best collection of Ornamental Bantams, Oke.

BANTAMS—A.O.V.

Cock.—1st, McNeil ; 2nd, Oke ; 3rd, Burn.
Hen.—1st, Oke ; 2nd, Donovan ; 3rd, McNeil.
Cockerel.—1st, Burn ; 2nd, McNeil ; 3rd, Oke.
Pullet.—1st, Oke ; 2nd, Donovan ; 3rd, McNeil.

DORKINGS—SILVER GREY.

Cock.—1st, Cox ; 2nd, Meyer.
Hen.—1st, McKee ; 2nd, McKee ; 3rd, McKee.
Cockerel.—1st, A. Bogue ; 2nd, McKee ; 3rd, Meyer.
Pullet.—1st, A. Bogue ; 2nd, McKee ; 3rd, Shore.
Special for best collection, McKee.

DORKINGS—COLORED.

Cock.—1st, A. Bogue.
Hen.—1st, A. Bogue ; 2nd, McCormack & Son.
Cockerel.—
Pullet.—1st, A. Bogue.
Special for best collection, A. Bogue.

DORKINGS—WHITE.

Cock.—1st, A. Bogue ; 2nd, A. Bogue.
Hen.—1st, A. Bogue ; 2nd, A. Bogue.
Cockerel.—1st, A. Bogue ; 2nd. A. Bogue.
Pullet.—1st, A. Bogue ; 2nd, A. Bogue.
Special for best collection, A. Bogue.
Special for best pair, A. Bogue.

POLANDS—W.C.B.

Cock.—1st, A. Bogue ; 2nd, McNeil.
Hen.—1st, A. Bogue ; 2nd, McNeil.
Cockerel.—1st, A. Bogue ; 2nd, A. McNeil.
Pullet.—1st, A. Bogue ; 2nd, McNeil.
Special for best collection, A. Bogue.

POLANDS—GOLDEN.

Cock.—1st, A. Bogue ; 2nd, McNeil.
Hen.—1st, McNeil ; 2nd, A. Bogue ; 3rd, P. Gould.
Cockerel —1st, McNeil ; 2nd, A. Bogue.
Pullet.—1st, A. Bogue ; 2nd, McNeil.

POLANDS—SILVER.

Cock.—1st, Burn ; 2nd, Burn.
Hen.—1st, Burn ; 2nd, Burn.
Cockerel.—1st, Burn.
Pullet.—1st, Burn.
Special for best collection, Burn.

POLANDS—WHITE.

Cock.—1st, A. Bogue; 2nd, McNeil.
Hen.—1st, McNeil; 2nd, A. Bogue.
Cockerel.—1st, A. Bogue; 2nd, McNeil.
Pullet.—1st, A. Bogue; 2nd, McNeil.

POLANDS—GOLDEN BEARDED.

Cock.—1st, McNeil; 2nd, A. Bogue.
Hen.—1st, McNeil; 2nd, A. Bogue.
Cockerel.—1st, A. Bogue; 2nd, McNeil.
Pullet.—1st, McNeil; 2nd, A. Bogue.

POLANDS—SILVER BEARDED.

Cock.—1st, McNeil; 2nd, A. Bogue.
Hen.—1st, A. Bogue; 2nd, McNeil.
Cockerel.—1st, A. Bogue; 2nd, McNeil.
Pullet.—1st, A. Bogue; 2nd, McNeil.
Special for best pullet, A. Bogue.

POLANDS—WHITE BEARDED.

Cock.—1st, McNeil; 2nd, A. Bogue.
Hen.—1st, McNeil; 2nd, Gould; 3rd, A. Bogue.
Cockerel.—1st, McNeil; 2nd, A. Bogue.
Pullet.—1st, McNeil; 2nd, A. Bogue.

POLANDS—BUFF LACED.

Cock.—1st, McNeil; 2nd, McNeil.
Hen.—1st, McNeil; 2nd, McNeil; 3rd, McNeil.
Cockerel.—1st, McNeil; 2nd, McNeil.
Pullet.—1st, McNeil; 2nd, McNeil; 3rd, McNeil.
Special for best collection, McNeill.

HOUDANS.

Cock.—1st, A. Bogue; 2nd, Trew; 3rd, Trew.
Hen.—1st, Trew; 2nd, Trew; 3rd, Trew.
Cockerel.—1st, Milton & Micheltree; 2nd, G. Bogue; 3rd, Milton & Micheltree.
Pullet.—1st, A Bogue; 2nd Trew; 3rd, G. Bogue.
Special for best hen, Milton & Micheltree.
Special for best pair, cockerel and pullet, A. Bogue.

CREVE CŒURS.

Cock.—1st, Oke; 2nd, Oke.
Hen.—1st, Oke.
Cockerel.—1st, Oke.
Pullet.—1st, Oke.
Special for best collection, Oke.

LA FLECHE.

Cock—1st, Oke.
Hen.—1st, Oke; 2nd, Oke.
Cockerel.—1st, Oke.
Pullet.—1st, Oke; 2nd, Oke.
Special for best collection, Oke.

SULTANS.

Cock.—1st, Oke.
Hen.—1st, Oke; 2nd, Oke.
Cockerel.—1st, Oke.
Pullet.—1st, Oke.
Special for best collection, Oke.

ORPINGTONS.

Cock.—1st, Wicks & Sons; 2nd, Wicks & Sons; 3rd, Stone.
Hen.—1st, Stone; 2nd, Wicks & Sons.
Cockerel.—1st, Stone; 2nd, Wicks & Sons.
Pullet.—1st, Wicks & Sons; 2nd. Wicks & Sons; 3rd, Stone.
Special for best collection, Wicks & Sons.

FOWLS—A. O. V.

Cock.—1st, McNeil; 2nd, Donovan; 3rd, Burn.
Hen.—1st, McNeil; 2nd, Donovan; 3rd, Dick.
Cockerel.—1st. McNeil; 2nd, Donovan; 3rd Dick.
Pullet.—1st, McNeil; 2nd, Donovan; 3rd, Dick.
Special for best collection, McNeil.

CHICKS—CROSS-BRED.

Cock.—
Hen.—1st, ; 2nd, Auld & Auld.
Cockerel.—1st, Wilson; 2nd. Readwin; 3rd, Groom.
Pullet—1st, Wilson.

BRONZE TURKEYS—TWO YEARS OLD AND UP.

Cock.—1st, Bell; 2nd, Beattie; 3rd, McDougall & Son.
Hen.—1st, Beattie; 2nd, Bell; 3rd, Ford & Son.

BRONZE TURKEYS—ONE YEAR AND UNDER TWO.

Cock.—1st, Beattie; 2nd, McDougall & Son; 3rd, W. E. Wright.
Hen.—1st, Beattie; 2nd, Bell; 3rd, W. E. Wright.

BRONZE TURKEYS OF 1900.

Cock.—1st, Bell; 2nd, Ford & Son; 3rd, McDougall & Son.
Hen.—1st, McDougall & Son; 2nd, C. B. Gould; 3rd, McDougall & Son.
Special for best bronze turkey, Bell.

WHITE OR BLACK, OLD.

Cock.—1st, Beattie; 2nd, Sangreen Poultry Yards; 3rd, Sangreen Poultry Yards.
Hen.—1st, Beattie; 2nd, Sangreen Poultry Yards; 3rd, Sangreen Poultry Yards.

TURKEYS OF 1900—WHITE OR BLACK.

Cock.—1st, Beattie; 2nd, Sangreen Poultry Yards, 3rd, Luxton.
Hen.—1st, Sangreen Poultry Yards; 2nd, Beattie; 3rd, Colwell & McDonald.
Special for best collection, Beattie.

TURKEYS—A. O. V., OLD.

Cock.—1st, A. Elliott; 2nd, A. Elliott; 3rd, Ford & Son.
Hen.—1st, A. Elliott; 2nd, A. Elliott; 3rd, Luxton.

TURKEYS OF 1900—A. O. V.

Cock.—1st, A. Elliott; 2nd, A. Elliott; 3rd, Luxton.
Hen.—1st, A. Elliott; 2nd, A. Elliott; 3rd, Luxton.

TOULOUSE GEESE—OLD.

Gander.—1st, A. Bogue; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.
Goose.—1st, Colwell & McDonald; 2nd, A. Bogue; 3rd, Colwell & McDonald.

TOULOUSE GEESE OF 1900.

Gander.—1st, Colwell & McDonald; 2nd, Colwell & McDonald.
Goose.—1st, Colwell & McDonald; 2nd, Colwell & McDonald.

BREMEN GEESE—OLD.

Gander.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.
Goose.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.

BREMEN GEESE OF 1900.

Gander.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.
Goose.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.

GEESE—A. O. V., OLD.

Gander.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Burn.
Goose.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Burn.

GEESE OF 1900—A. O. V.

Gander.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Burn.
Geese.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Burn.
Special for best collection, Colwill & McDonald.

AYLESBURY DUCKS—Old.

Drake.—1st, Colwell & McDonald; 2nd, A. Bogue; 3rd, Colwell & McDonald.
Duck.—1st, A. Bogue; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.

AYLESBURY DUCKS OF 1900.

Drake.—1st, A. Bogue; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.
Duck.—1st, Colwell & McDonald 2nd, A. Bogue; 3rd, Colwell & McDonald.
Special for best collection, Colwell & McDonald.

ROUEN DUCKS—Old.

Drake.—1st, Colwell & McDonald; 2nd, A. Bogue; 3rd, Burn.
Duck.—1st, Burn; 2nd, A. Bogue; 3rd, Colwell & McDonald.

ROUEN DUCKS OF 1900.

Drake.—1st, Burn; 2nd, Colwell & McDonald; 3rd, Colwell & McDonald.
Duck.—1st, Colwell & McDonald; 2nd, Colwell & McDonald; 3rd, Burn.
Special for best four ducks, Colwell and McDonald.

PEKIN DUCKS—Old.

Drake,—1st, Colwell & McDonald ; 2nd, Karn ; 3rd, A. Bogue.
Duck.—1st, Colwell & McDonald ; 2nd, A Bogue ; 3rd, Colwell & McDonald.

PEKIN DUCKS OF 1900.

Drake.—1st, Karn ; 2nd, Colwell & McDonald ; 3rd, Colwell & McDonald.
Duck.—1st, Colwell & McDonald ; 2nd, Colwell & McDonald ; 3rd, Karn.
Special for best four ducks, Colwell & McDonald.

A. O. V. DUCKS—Old.

Drake.—1st, McCormack & Son ; 2nd, Powell ; 3rd, G. Bogue.
Duck.—1st, Powell ; 2nd, G. Bogue ; 3rd, McCormack & Son.

A. O. V. DUCKS OF 1900.

Drake.—1st, Karn : 2nd, Colson ; 3rd, Burn.
Duck.—1st, G. Bogue ; 2nd, Colson ; 3rd, Burn.
Special for best pair of Cayuga ducks, old, McCormack.
Special for best pair Cayuga ducks, young, G. Bogue.
Special for best pair of India Runner ducks, Colson.

PHEASANTS.

English.—1st, Burn ; 2nd, Lee.
Golden.—1st, Burn.
Silver.—1st, Burn.
A. O. V.—1st, Burn.
Special for best collection, Burn.

PIGEONS.

BLACK CARRIER.

Cock.—1st, Baulch ; 2nd, White.
Hen.—1st, Baulch ; 2nd, Baulch.

DUN CARRIER.

Cock.—1st, White ; 2nd, Nahrgang.
Hen.—1st, White ; 2nd, White.

A. O. S. C. CARRIER.

Cock.—1st, Baulch ; 2nd, White.
Hen.—1st, Baulch ; 2nd, White.
Special for best collection, Baulch.

WHITE POUTER.

Cock.—1st, Massie ; 2nd, Magill.
Hen.—1st, Massie ; 2nd, Magill.

POUTER—BLUE PIED.

Cock.—1st, Magill ; 2nd, Magill.
Hen.—1st, Magill ; 2nd, Magill.

POUTER—BLACK PIED.

Cock.—1st, Magill ; 2nd, Magill.
Hen.—1st, Magill ; 2nd, Magill.

POUTER—YELLOW OR RED.

Cock.—1st, Massie.
Hen.—1st, Massie.
Special for best collection, Magill.

TUMBLERS—S. F.

Cock.—1st, McPhie ; 2nd, Nahrgang.
Hen.—1st, Nahrgang ; 2nd, McPhee.

TUMBLERS—A. O. V.

Cock.—1st, Donovan ; 2nd, Donovan.
Hen.—1st, Donovan ; 2nd, Donovan.
Special for best collection, Donovan.

RED BARB.

Cock.—1st, Nahrgang.
Hen.—1st, Nahrgang.

BLACK BARB.

Cock.—1st, Nahrgang.
Hen.—Nahrgang.

A. O. S. C. BARB,

Cock.—1st, White.
Hen.—1st White.

WHITE TRUMPETER.

Cock.—1st, Baulch ; 2nd, Baulch.
Hen.—1st, Baulch ; 2nd, Baulch.

A. O. S. C. TRUMPETER.

Cock.—1st, Baulch ; 2nd, Nahrgang.
Hen.—1st, Baulch ; 2nd, Nahrgang.

JACOBINS—RED OR YELLOW.

Cock.—1st, Massie ; 2nd, Massie.
Hen.—1st, Massie ; 2nd, Massie.

JACOBINS—WHITE.

Cock.—1st, Massie ; 2nd, Massie.
Hen.—1st, Massie ; 2nd, Massie.

JACOBINS.—A. O. S. C.

Cock.—1st, Massie; 2nd, Massie.
Hen.—1st, Massie; 2nd, Massie.
Special for best collection, Massie.

ANTWERPS—R. C.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—1st, Donovan; 2nd, Donovan.

ANTWERP—SILVER DUN.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—Donovan; 2nd, Donovan.

WHITE FANTAILS.

Cock.—1st, Massie; 2nd, Massie.
Hen.—1st, Massie; 2nd, Massie.

A. O. S. C. FANTAILS.

Cock.—1st, Nahrgang; 2nd, Wangenheim.
Hen.—1st, Wangenheim; 2nd, Nahrgang.
Special for best collection, Massie.

MAGPIES—RED OR YELLOW.

Cock.—1st, White; 2nd, Wangenheim.
Hen.—1st, White; 2nd, White.

MAGPIES—A. O. C.

Cock.—1st, White; 2nd, Wangenheim.
Hen.—1st, White; 2nd, Wangenheim.

SHOW HOMERS.

Cock.—1st, McPhie; 2nd, McPhie.
Hen.—1st, McPhie; 2nd, McPhie.

SWALLOWS.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—1st, Donovan; 2nd, Donovan.

DRAGOONS.

Cock.—1st, Wangenheim; 2nd, Wangenheim.
Hen.—1st, Wangenheim; 2nd, Wangenheim.

ARCHANGELS.

Cock.—1st, Wangenheim; 2nd, Burn.
Hen.—1st, Wangenheim; 2nd, Burn.

NUNS.

Cock.—1st, Donovan; 2nd, Nahrgang.
Hen.—1st, Donovan; 2nd, Nahrgang.

OWLS.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—1st, Donovan; 2nd, Donovan.

BLACK TURBITS.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—1st, Donovan; 2nd, Donovan.

A. O. C.—TURBITS.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—1st, Donovan; 2nd, Donovan.

A. O. S. V. PIGEONS.

Cock.—1st, Donovan; 2nd, Donovan.
Hen.—1st, Donovan; 2nd, Donovan.

RABBITS—LOP-EARED, SOLID COLOR.

Male.—1st, Fox; 2nd, Fox.
Female.—1st, Fox; 2nd, Burn.

RABBITS—A. O. V. LOP-EARED.

Male.—1st, Fox; 2nd, Fox.
Female.—1st, Fox; 2nd, Nahrgang.

DUTCH RABBITS.

Male.—1st, Fox; 2nd, Fox.
Female.—1st, Fox; 2nd, Fox.

A. O. V. RABBITS.

Male.—1st, Fox; 2nd, Fox.
Female.—1st, Fox; 2nd, Fox.

BELGIAN HARES.

Male.—1st, Fox; 2nd, Fox.
Female.—1st, Fox; 2nd, Fox.
Special for best pair, Fox.

A. O. V. CANARIES.

Cock.—1st, Tyson.
Hen.—1st, Tyson.

EASTERN ONTARIO POULTRY ASSOCIATION.

REPORT OF THE SECRETARY.

I have the honor to submit the Annual Report of the Seventeenth Annual Exhibition of this Association. The exhibition this year was held in the Town Hall, at Almonte, being the first year this Association had visited that town.

It is regrettable that Montreal and Toronto should have chosen our dates, as it no doubt affected some entries, but we can congratulate ourselves on the fact that we could not have given proper accommodation to any more entries. Under the skilful hands of our Superintendent, Mr. W. G. Gray, and his assistant, Mr. B. Webb, the coops were arranged to the best advantage, and all entries received proper care and attention. Your Secretary was ably assisted by Mr. E. H. Benjamin, who, being well trained in the duties of his office, handled matters in the way they should be.

In comparing this exhibition with that of its predecessor, I find that the general utility breeds were better represented and in larger numbers, while what would be termed the fancy varieties (such as Polish) were not so much in evidence. Bantams and Pigeons were fewer in number but the quality exhibited were, if anything, better, and from the remarks made by visitors, proved that this branch is a decided drawing card so far as gate money is concerned. Taking the different classes as a whole, I think the specimens exhibited show a steady improvement, and at the same time prove that the fancier in breeding for feather has not neglected the question of size. Your Secretary in attending the judge had occasion to remark this in his placing the awards. Size was his first consideration, and the greatest allowance was given to the large bird. For example, take the first prize cock birds in Plymouth Rocks, Wyandottes, and Dorkings. The birds were the largest and at the same time nearest the mark from a point of feather. The farmers' classes for pens were strongly represented, being nine in number, and the quality displayed was above the average. Some specimens in this class would have taken honors in the regular classes. The exhibit of eggs was a good one.

The annual meeting was held on Wednesday evening during show week, and was well attended. After the meeting had been called to order the Secretary-Treasurer read the minutes of the previous annual meeting and the financial statement, which were adopted.

Mr. F. C. Hare, the representative of the Dominion Government in the interests of poultry, was present, and explained to the meeting the advantages the association would gain in holding their annual exhibition in conjunction with the Provincial Auction Sales (to be held at Ottawa), and at the same time make it a permanent place of holding their show. This would, in the majority of cases, suit exhibitors better, as all express companies have offices in Ottawa. The choice of Almonte for our last show was a good one from a point of interest taken by the people of that district in fowl, but was a poor one from the exhibitors' standpoint, as outside of Ottawa entries all exhibits had to change cars at least once, and some of them as many as four times. It was agreed that the place of holding our next Annual Show be left over to the Board of Directors to decide, with power to the Directors to join the Provincial Winter Auction Sales should they see fit, and that a committee of three be appointed to make the necessary changes in the by-laws and submit same for the approval of the Directors. Messrs Gisborne, Benjamin and Mutchmor were appointed the Committee. Messrs. Higman, Gray, and Gilbert act as a committee to arrange a series of experiments in feeding, etc., along practical lines, the results to be laid before the members of the Association.

The Hon. Sydney Fisher, Minister of Agriculture, was elected Patron of the Association, and Mr. F. W. Hodson, Live Stock Commissioner for the Dominion, Honorary President. Mr. R. W. Graham, of the Ontario Agricultural College, was elected to the Board of Directors. Mr. G. L. Blatch, C.A., was elected Auditor.

I have the honor to be,

Your obedient servant,

A. PERCY MUTCHMOR,

Secretary-Treasurer.

Ottawa, January, 1901.

EASTERN ONTARIO POULTRY ASSOCIATION.

OFFICERS FOR 1901.

President ..... FRANCIS H. GISBORNE ..... Ottawa.
1st Vice-President ..... G. S. OLDRIEVE ..... Kingston.
2nd Vice-President ..... C. J. DEVLIN ..... Ottawa.
Secretary-Treasurer ..... A. P. MUTCHMOR ..... Ottawa.
Directors :
Division No. 1 ..... W. M. OSBORNE ..... Brockville.
" 2 ..... GEORGE HIGMAN ..... Ottawa.
" 3 ..... W. H. REID ..... Kingston.
" 4 ..... A. P. MUTCHMOR ..... Ottawa.
Auditor ..... GEORGE L. BLATCH, C.A. ..... Ottawa.

FINANCIAL STATEMENT.

Following is a statement of receipts and disbursements for 1900 of the Eastern Ontario Poultry Association :

RECEIPTS.

Balance on hand from previous year in the bank	$479 42
Legislative grant	500 00
" " coops	250 00
Membership fees	50 00
Entry fees	231 75
Scoring fees	2 90
Interest from bank account	22 92
Gate money at exhibition	22 50
Total receipts	$1,559 49

DISBURSEMENTS.

Cash paid for prize money	$583 33
Officers salaries	50 00
Postage and stationery	5 50
Printing	17 50
Advertising	15 86
Judges	65 00
New wire coops, freight and duty	283 28
Repairing coops	4 30
Superintendent	14 00
Caretaker	15 00
Door-keeper	4 00
Clerical assistance	10 00
Feed	11 62
Cartage	12 00
Auditor, 2 years	10 00
Rubber stamp	3 40
Rent for exhibition hall	25 00
Lighting "	15 70
Heating "	4 00
Cleaning	1 00
Sundry disbursements	2 55
Total disbursements	$1,156 04

Balance at credit in bank $403 45

LIABILITIES.

Balance due Secretary	55 29	
Prize money to O'Toole & Noel pending decision of protest.	11 50	
		66 79
Surplus		$336 66

Examined and found correct this 10th day of March, 1900.

G. L. BLATCH, C.A.,
Auditor.

A. P. MUTCHMOR,
Treasurer.

EXHIBITORS FOR 1901.

Name.	Post office.	Varieties exhibited.
Francis H. Gisborne	Ottawa	Indian Game.
Devlin & Jacques	"	Barred Plymouth Rocks.
W. G. Gray	"	White Plymouth Rocks and S. C. Brown Leghorns.
McKellar & Magurn	"	S. C. White Leghorns.
Thos. Mills	"	S. C. White and Brown Leghorns.
J. McKenzie	"	Cochin Bantams
G. C. Beeson	"	Light Brahmas and Cochin Bantams
Geo. Higman	"	White, Golden and Buff Wyandottes and Jacobin Pigeons.
Ottawa Poultry Yards	"	S. C. White and Brown Leghorns, Cochins, Langshans, Andalusians, Minorcas, Games, Hamburgs, Wyandottes, White Plymouth Rocks, Game and Cochin Bantams, Ducks, and Geese.
Ottawa Pigeon Lofts	"	Pigeons.
E. H. Benjamin	"	Pit Game, Buff Plymouth Rocks, Rhode Island Reds.
A. A. Fraser	Sandringham	Minorcas.
G. S. Oldrieve	Kingston	Golden Wyandottes, R. C. Brown Leghorns, Barred Plymouth Rocks, Games, Seabright, Game and Black R. C. Bantams.
W. H. Reid	"	Cochins, Javas, Langshans, Andalusians, Polands, Buff Wyandottes, Black and R. C. Leghorns, Spanish, Golden Spangled and Black Leghorns, Houdans, Dorkings, Buff Plymouth Rocks, Seabright-Cochin, Japanese, Game and Booted Bantams, Ducks, and Pigeons.
W. J. Driver & Co	"	Javas, Langshans, Golden Wyandottes.
J. Neilson	Lyn	Dorkings, Spanish, Buff and R. C. Leghorns, Indian Game, Pit Game, Hamburgs, Barred Plymouth Rocks, Polands, Golden Wyandottes, Ducks.
W. M. Osborne	Brockville	Black Leghorns, White Minorcas.
A. Thompson	Allan's Corners	Turkeys and Geese.
E. Harmer	Westboro'	Buff Orpingtons.
Peter McGregor	Almonte	Golden Wyandottes.
A. Cochrane	"	Bronze Turkeys.
Miss E. J. Darling	"	Blue Sweedish Ducks.
R. Craig, Jr	"	Silver Wyandottes.
Alex. Steele	"	Golden and Silver Wyandottes.
Gilbert & Jardine	"	S. C. White Leghorns, Houdans.
Garland & Gillespie	Hintonburg	Barred Plymouth Rocks, Silver Wyandottes, Langshans, Seabright Bantams.
Jas. Anderson	Dominionville	Black Minorcas
S. D. Frith	Winchester	Andalusians, White Plymouth Rocks.
Mrs. G. C. Holland	Ottawa West	White Langshans, Javas, White Wyandottes, Black Minorcas, White R. C Leghorns, Light Brahmas, Buff Cochins.
W. Stewart & Son	Menie	Dorkings, Black Minorcas, S. C. White and Brown Leghorns, Indian Game, R. C. Leghorns, Hamburgs, Polands, Houdans, Red Caps, Seabright Bantams, Turkeys, Geese, Ducks.
D. Cumming	Russell	Barred and Buff Plymouth Rocks, Indian Game, S. C. Brown Leghorns, Spanish, Minorcas, Turkeys, Ducks and Geese.
Mrs. J. Yuill	Carleton Place	Barred Plymouth Rocks.
N. D. McPhie	Hamilton	Pigeons.
Dr. J. H. Bastien	Rigaud	Polands, S. C. Brown Leghorns, Spanish, Houdans, R.C. Leghorns, Games.
Mrs. H. B. Billings	Billing s Bridge	S. C. White and Brown Leghorns, Langshans, Golden and Silver Wyandottes, White and Barred Plymouth Rocks.

MARKET FOWL.

By F. H. Gisborne, Ottawa.

It is very important in view of the strides that are being taken in the production of poultry for the market, and the keen competition that is sure to become keener and keener each year, that poultry raisers should be fully alive to the respective merits of the various breeds and first crosses. I say first crosses, for after the first cross the bird either becomes a mongrel of no fixed type, or else adopts the type of the breed from which the principal part of its blood is derived. I have during the past few years raised crosses of quite a number of different breeds, and in no case have I found the birds any distinct improvement on thoroughbreds, while most of them have been distinctly worthless. Sometimes a bird has been better than its parents, but I have never raised a cross-bred bird that gave qualities as good as could be secured in one of the established breeds. In order, however, that experiments in cross-breeding may be of any value they must be carefully repeated on a fairly large scale several years in succession. Our experimental work in poultry has up to this time been conducted in altogether too hasty a manner and conclusions drawn from insufficient data. In this, of course, I do not include the experiments in fattening poultry. These, indeed, are not, properly speaking, experiments at all; they are illustrations of the system that has been in practical and successful operation in England for years. Professor Robertson has merely demonstrated that there is no reason why the system should not be adopted in Canada. And he has not only skilfully demonstrated this fact, but he has also worked up an inexhaustible market in England for the Canadian product.

First let us clearly understand what type of bird we want for the best market. It should be fine in bone, white in meat and skin, and fleshy in the breast, and it should be a rapid developer, making a growth of say seven pounds live weight in six months. The only breed that I know of that exactly fills all these requirements, and is hardy enough for the eastern portion of Ontario, is the Wyandotte. The Plymouth Rock is a close rival, but the bone is too heavy and coarse, and though you can easily raise the seven pounds in six months, you get too large a proportion of bone. Moreover, the bird will not fatten as quickly as a Wyandotte. Both Plymouth Rocks and Wyandottes, as now bred, have yellow legs, but a constant severe selection has to be made by the fanciers to keep the yellow legs, and there is no difficulty at all in getting and breeding birds with white legs. A recent candidate for public favour is the Orpington, which has been imported and bred in two colours in this part of Canada, black and buff. These birds are very rapid growers and very large and vigorous, but they are very coarse in bone—at least those specimens are that I have seen.

In England two cross-breds that have been very successful in the dressed poultry shows are Langshan-Indian Game and Dorking-Indian Game. I have seen birds of both these crosses, but those I saw did not favourably impress me. I purpose this year to try crosses of Indian Games and Plymouth Rocks, possibly also Indian Games with Dorkings and Wyandottes, but my premises are too small to conduct the experiment in a thoroughly satisfactory manner It seems to me that the first named cross is objectionable, as likely to produce too much bone and both breeds are rather slow in development. To properly test the value of these crosses the half-bred chicks ought to be raised under similar conditions, and in addition thoroughbred chicks of each variety should also be raised. At the recent exhibition of the Eastern Ontario Poultry Association at Almonte, where there was a large and fine display of the principal market breeds of fowl, I very carefully examined the best types of each variety to ascertain their respective merits in length and width (thickness) of breast, coarseness of bone and whiteness of meat. I refer particularly to Dorkings, Plymouth Rocks, Wyandottes, Houdans, Langshans, Indian Games, and Buff Orpingtons. There was a distinct difference in length of keel, but not as much as I expected. I tried to measure the different birds, but I only had a foot rule, and I found it impossible with this to get any reliable results. The Orpingtons were, so far as I could judge, the longest, closely followed by the Dorkings; among the rest there was not a great deal of difference. In width of breast the Indian Games were very markedly the best. In fineness of bone there was not much to choose between Dorkings, Houdans and Wyndottes. And on the whole I was strongly inclined to strike the Langshans off the

list of superior market fowl. After a most careful consideration I could not see that any cross could add much to the thoroughbreds, except perhaps the width of breast from the Indian Games, and the unknown value of the extent to which a cross would lead to more rapid development and vigour in the chickens.

In conclusion I can only state that while those who go in for egg raising have pretty well solved the problem of the best breed for layers, there is still a great deal of work before the man who is engaged in raising market fowl. Personally I believe that the solution of the problem is in developing existing breeds in certain practical directions, and not in raising cross-bred birds at all. This is the lesson that is taught by the raisers of the best table poultry on the continent of Europe. Not having a breed like the Plymouth Rocks or Wyandottes to start with they made breeds of their own, but with Plymouth Rocks and Wyandottes to start with here I think the effort should rather be to improve these breeds than to experiment with cross-breeding.

This is, however, merely my own opinion and the value of it can only be tested by actual practical tests—tests that can only be properly carried out by the Government officers who are now doing such splendid work under the direction of the Ministers of Agriculture of the Dominion and Ontario.

AS TO YARDING FOWL.

By E. H. Benjamin, Ottawa.

Among the most modern ideas of the improvement of fowl is the fast growing—I may say fast becoming popular—method of yarding fowl. From time's earliest date in the care of poultry we were taught to let our stock run at large. It was considered the only way to treat poultry, and this familiar method was coupled with the universal system of letting fowl shift entirely for themselves. By letting them have free range they necessarily had free access to whatever they could find. The farmers seldom fed them, or in fact, knew whether they had the same number at night that wandered off in the morning. The scraps and refuse from the kitchen were generally thrown out on the ground, and if the fowl found it they were so much ahead. And yet with such happy-go-lucky methods of care the poor half starved fowl were supposed to lay eggs.

I can say that the methods of farmers have improved since these early days, and some of them are generous enough to provide a sort of coop, and throw their fowl, not oftener than once a day, a little whole corn. They still adhere to the free range idea, and I am convinced that it is not purely because they think it necessary, but it saves feed and other bother. It has been estimated that a flock of common dunghill hens such as are seen on the average farm, lay in a year less than one hundred eggs each—the figures given are eighty or ninety. Farmers who have become breeders, and who thus give the hen decidedly more consideration, and still adhere to the free range system, have increased their egg yield to one hundred and fifty, or better. Breeders who are following the strictly up-to date methods, and have yarded their layers, have obtained an average of one hundred and seventy-five eggs and some have even reached the two hundred mark.

Please note that I say fowl or hens, and I do not mean this to include growing chicks. The line must be distinctly drawn between the two. The range cannot be too extended for growing stock. What we strive for in growing chicks is frame on which we intend to put flesh later. This frame can only be built by food, and plenty of it, converted into bone and muscle by exercise. After the chick has made the frame, we can safely yard her and put on the flesh, and thus convert her into a money-making machine.

The advantages gained by yarding stock are manifold. First of all by confining stock to certain space we are sure they eat the food provided, and in the quantity we mean them to have. Feeding layers to produce eggs is becoming every year a more delicate operation. Formula after formula is tried by different breeders as an experiment, with the hope of increasing the egg yield. If we can force each hen to lay 10 eggs a year more it means a considerable increase in the total of the flock, and a better return in dollars and cents to the breeder. Yarding stock is a means towards this end. The food fed is converted as we mean it to be, into eggs, and not into muscle.

It is decidedly more troublesome to care for stock in this way, and necessitates additional labor and expense, but we are looking for the increase all the time, and are thus continually hoping to be compensated for the extra trouble.

Fowl in yards must be supplied with everything they require, which means all they would naturally seek if they were running at large. This includes, besides the grain we feed by formula, green food, meat, a scratching place, dusting spot, grit, and water. Of these I consider green food the most necessary and the one thing to be impressed upon the mind, because it is the one thing too often forgotten. Green food of any variety is acceptable. The ideal yarding of fowl is what is known as double yarding, a house in the middle and a yard on each side. These yards can be sown with rye or oats, and attended so that the fowl have a constant green run as long as the rye or oats will grow, which is until frost. Failing in the double yard system, green food may be supplied by lawn clippings, whole cabbage, mangels, turnips or any vegetable fed whole in the warm weather, and boiled and mixed in mash in cold weather. Meat can be fed in a variety of ways. Turning up the ground of the yards with a cultivator or by plowing, will bring the bugs and worms within reach, or sheeps'-heads cut open and fed raw can be thrown in, and this is an ideal meat feed. Ground beef scraps softened may be mixed in mash, and lastly and probably the best, cut green bone.

Yarded fowl need exercise. It must not be understood that because they are confined they do not get exercise or as much as if let run at large. The yards should be at least one hundred and fifty yards long, if they are the width of the average coop, which is ten or twelve feet. Some breeds are decidedly more active than others; for instance, the Leghorns as compared to the Cochins or Brahmas. This does not affect the health of the fowl particularly. A Leghorn is no healthier because of her activity than a Cochin is. It is simply the difference in their natures; but because of the activity of one breed over the other, the one must have more room than the other. The Leghorn stands the confinement of a small coop ten by twelve feet in winter, provided she can be kept actively hunting for her food; but the same bird would mope and become out of condition if confined too long in an exhibition coop in the show room. On the other hand a Cochin being of a larger nature forages slowly, and wanders quietly over her yard, takes things easy in the winter coop and stands the confinement of the exhibition coop excellently.

The foraging nature of any breed can be killed by excessive feeding. Even birds with free range, if over fed at specified meal hours, will take but limited exercise, exactly as those treated the same way and yarded. Exercise is induced by short feeding, in other words no laying strain should be fed all they can eat except at nights. Hunger induces excercise whether a fowl be yarded or let run. Therefore, fowls fed short and induced to hunt for more, will lay eggs, while those overfed in the morning especially, will sit around moping in the sun, and convert food into flesh instead of eggs.

Another advantage of yarded fowl is the certainty of finding all the eggs laid every day, and thus being able to guarantee them strictly fresh. This is a point of great importance, and constitutes the difference between eggs produced by an up to-date breeder with yarded fowl, and those sold by the "honest farmer" who collects them wherever found, and cannot swear that they were laid to-day or two weeks ago.

Yarded fowl are tamer than any other. This is natural. The feeder comes in contact with them, and they become accustomed to his presence at stated intervals. This makes quite a difference with the egg yield. Fowl are so much creatures of habit that they are frequently upset by having their habits interfered with. A hen that is a good layer chooses to perform this duty in her own particular way; she establishes for herself certain times in which to feed, drink, dust and lay. If these times are interfered with, it upsets her at least for a day, and consequently is off in her laying. Even a cock during the winter may bother a hen by his too gallant attention, and thus reduce her egg production considerably. It has been estimated that a flock of hens without a cock will lay almost a third more eggs during the fall and winter. Yet there are many people—yes, nine out of ten—who think a hen cannot lay an egg without a cock.

Water and grit are very necessary to a hen's health and general well being. The former should be given every day fresh and clean, the latter as often as the boxes are empty, and they will be empty the quickest when the most eggs are laid. Yarded fowl reduce the system of care and feed for layers to a certainty as to results. We can by having our flock in sight and control, watch their health, habits, and ability to earn their

living, all of which is of vital consequence if we wish to make a success of poultry, and make them earn us a profit. Fowl with free range become in these days of modern poultry culture almost a matter of guess work, and they are never under our control except when housed at night.

I believe I am safe in saying that the yarding of fowl is fast taking the place of the old method, and I consider it so full of advantages that it makes the free range idea seem obsolete.

POULTRY AS A BUSINESS.

By C. J. Devlin, Ottawa.

Nearly every poultry breeder of any note is asked regarding the investment of sums of money in the poultry business as a means of making money or a living, and in most cases these applicants are novices that know very little about poultry. They may have kept a dozen or so of fowl and made them pay, but were they to increase the number in order to make a living they would find that to rely on the poultry business as a means of support one must learn its requirements the same as any other business. A man may build fine poultry houses and stock them with the best of stock, but if he has not first learned how to feed or care for them in order to gain the best results, or if he does not engage a first-class man who has the experience, the chances are very much against him making it a success. There are certainly breeders of poultry who are not only making a living out of it, but are adding each year a snug little sum to their capital. There is no other business in which you can invest the same amount of capital and get the same returns as you can from poultry, provided you give each the same amount of attention.

At one time it was considered a small business for any man to be engaged in, and was generally left for the women of the house to look after; but latterly things have changed, and now you find in the United States an ex-President and several other men of note who are engaged in it. Whether they make it pay or not I cannot say, but think that if you wrote to any of these gentlemen and asked for prices of some of their stock you would come to the conclusion that at the prices quoted you they must be making money. No class of people are in so good a position to raise poultry for profit as our farmers, and certainly none have better opportunities to raise exhibition stock. They have unlimited range and natural food to be found thereon in the growing season, both of which are a decided advantage over the successful breeder of to day, who in the majority of cases is depending on the back yard to raise his stock on. As a rule our farmer looks upon his fowl as more of a nuisance than a help and only allows them on the farm because he does not have to look after them. If he gave these fowl the same amount of attention as he does his other stock he would soon find that they were the most profitable. They are always left to the care of a wife or daughter, who have so many other duties to perform in connection with household affairs that the fowl becomes a secondary consideration, yet with all this the wife and daughter will tell you that without them they would often have to go without sugar for their tea, and sometimes the tea too.

The poultry business has made wonderful progress the last few years' and now ranks as one of the leading industries of the world, but in order to engage in it successfully one must, like in any other business, commence at the bottom by serving an apprenticeship and gradually work his or her way up, and depend upon it that with proper care and attention it will be found to be the most profitable business that one could choose to engage in.

ANNUAL EXHIBITION.

The Seventh Annual Exhibition of the Eastern Ontario Poultry Association was held in the Town Hall at Almonte, from the 15th to the 18th inst. Owing to Toronto and Montreal having chosen the same dates, it was expected that the show would suffer by way of entries, but the Association is to be congratulated on the splendid showing made, there being about nine hundred entries. Below will be found a list of the awards.

On Wednesday evening the annual meeting was held, being well attended. President Blake was in the chair, and after calling the meeting to order, the Secretary-Treasurer, A. P. Mutchmor, read the minutes of the previous annual meeting and financial statement, which showed the Association to be in a flourishing condition.

Mr Hare, the representative of the Dominion Government in the interests of poultry, was present and explained to the meeting the advantages the Association would gain by holding their exhibition in conjunction with the Provincial winter sales, which is proposed to be held at Ottawa, and to settle on Ottawa as a permanent place of holding their show. It was unanimously agreed that the place of holding the next annual show be left over for the Board of Directors with power to the Directors to join the winter auction sales, should they see fit, and that a committee of three be appointed to make the necessary changes in the By-laws and submit same to the approval of the Directors. Messrs. Gisborne Benjamin and Mutchmor were appointed this committee. Messrs. Gray, Higman and Gilbert were appointed a committee to arrange a series of experiments in feeding, etc., along practical lines, results of which are to be laid before the members of the Association.

The Hon. Sidney Fisher, M.P., Minister of Agriculture, was elected Patron, and Mr. F. W. Hodson, Live Stock Commissioner for the Dominion, Hon.-President. Mr. W. R. Graham, of the Ontario Agricultural College, was added to the Board of Directors. Mr. Geo. L. Blatch, C.A., of Ottawa, was re-elected auditor, and Messrs. Gisborne and Mutchmor were appointed delegates to the Central Canada Exhibition.

The appointment of the judge or judges was left to the Directors. It was agreed that the thanks of the Association should be tendered to the corporation of the town of Almonte for the use of their hall in which this show was being held.

LIST OF AWARDS.

Light Brahmas.

Cock: 1st and 2nd, S. J. Allan ; 3rd, Dr. J. H. Bastien.
Hen: 1st and 2nd, G. C. Beeson ; 3rd, Mrs. G. C. Holland.
Cockerel: 1st and 2nd, G. C. Beeson ; 3rd, W. J. Driver & Co.
Pullet: 1st and 2nd, G. C. Beeson ; 3rd, Mrs. G. C. Holland.

Dark Brahmas.

Hen: 3rd, Allen ; no award for 1st and 2nd.
Cockerel: 2nd, Allen ; no award for 1st.

Buff Cochin.

Hen: 1st, Mrs. Holland ; 2nd and 3rd, Ottawa Poultry Yards.

Partridge Cochin.

Cock: 1st, W. H. Reid.
Hen: 1st, W. H. Reid.
Cockerel: 1st, Bastien.
Pullet: 1st, Bastien.

Black Cochin.

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st and 2nd, Ottawa Poultry Yards.

White Cochins.

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st, Ottawa Poultry Yards.
Cockerel: 2nd, Bastien ; 3rd, Ottawa Poultry Yards.
Pullet: 2nd, Bastien.

Langshans.

Cock: 1st, Ottawa Poultry Yards ; 2nd, Mrs. Holland ; 3rd, Driver & Co.
Hen: 1st and 2nd, Ottawa Poultry Yards ; 3rd, Driver & Co.
Cockerel: 1st, Reid ; 2nd, Ottawa Poultry Yards ; 3rd, Garland & Gillespie.
Pullet: 1st, Reid ; 2nd, Driver & Co. ; 3rd, Garland & Gillespie.

Javas.

Cock: 1st, Driver & Co.
Hen: 1st and 2nd, Mrs. Holland ; 3rd, Reid.
Cockerel: 1st, Mrs. Holland ; 2nd, Driver & Co.
Pullet: 1st, Reid ; 2nd, Driver & Co.

SILVER GRAY DORKINGS.

Cock: 1st, Reid ; 2nd, Ottawa Poultry Yards ; 3rd, J. A. Neilson.
Hen: 1st, Reid ; 2nd, Stewart & Son ; 3rd, Neilson.
Cockerel: 1st, Reid.
Pullet: 1st, Reid ; 2nd, Stewart & Son : 3rd, Neilson.

A. O. V. DORKINGS.

Cock: 1st, Stewart & Co.
Hen: 1st and 2nd, Stewart & Co.
Cockerel: 1st, Stewart & Co.
Pullet: 1st, Stewart & Co.

BARRED PLYMOUTH ROCKS.

Cock: 1st, Devlin & Jacques ; 2nd, Neilson ; 3rd, Mrs. J. Yuill.
Hen: 1st, 2nd and 3rd, Devlin & Jacques.
Cockerel: 1st, G S. Oldreive ; 2nd, Allen.
Pullet: 1st and 2nd, Devlin & Jacques.

WHITE PLYMOUTH ROCKS.

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st and 3rd, W. G. Gray ; 3rd, Ottawa Poultry Yards.
Cockerel: 1st, Gray ; 2nd, Frith ; 3rd, Allen.
Pullet: 1st, Gray ; 2nd: Frith.

BUFF PLYMOUTH ROCKS.

Hen: 1st, Allen ; 2nd, E. H. Benjamin ; 3rd, D. Cummings.
Cockerel: 1st Cummings ; 2nd and 3rd, Allen.
Pullet: 1st, Reid ; 2nd, Cumming ; 3rd, Allen.

GOLDEN LACED WYANDOTTES.

Cock: 1st, Oldreive ; 2nd, Driver & Co. ; 3rd, Ottawa Poultry Yards.
Hen: 1st, Neilson ; 2nd, Ottawa Poultry Yards ; 3rd, Oldreive.
Cockerel: 1st, Allen ; 2nd, Oldreive ; 3rd, Ottawa Poultry Yards.
Pullet: 1st, P. McGregor ; 2nd, Ottawa Poultry Yards ; 3rd, G. Higman.

SILVER LACED WYANDOTTES.

Cock: 1st, Craig.
Hen: 1st, Craig.
Cockerel: 1st and 2nd, Ottawa Poultry Yards ; 3rd, Garland & Gillespie.
Pullet: 1st and 2nd, Ottawa Poultry Yards ; 3rd, Garland & Gillespie.

BUFF WYANDOTTES.

Cockerel: 1st, 2nd and 3rd, Higman.
Pullet: 1st, 2nd and 3rd, Higman.

WHITE WYANDOTTES.

Cock: 1st, Higman ; 2nd and 3rd, Allen.
Hen: 1st, Higman ; 2nd, Mrs. Holland ; 3rd, Allen.
Cockerel: 1st, Ottawa Poultry Yards ; 2nd and 3rd, Mrs. Holland.
Pullet: 1st, Higman ; 2nd and 3rd, Mrs. Holland.

BLACK SPANISH.

Cock: 1st, Cumming ; 2nd, Neilson ; 3rd, Allen.
Hen: 1st, Allen ; 2nd, Cumming ; 3rd, Bastien.
Cockerel: 1st, Reid ; 2nd Bastien.
Pullet: 1st, Reid ; 2nd, Bastien.

ANDALUSIANS.

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st, Reid ; 2nd, Frith ; 3rd, Anderson.
Cockerel: 1st, Frith.
Pullet: 1st, Reid ; 2nd, Anderson ; 3rd, Frith.

BLACK MINORCAS.

Cock: 1st, Ottawa Poultry Yards ; 2nd, Stewart & Son.
Hen: 1st, Stewart & Son ; 2nd, Ottawa Poultry Yards ; 3rd, Fraser.
Cockerel: 1st, Stewart & Son ; 2nd, Garland & Gillespie ; 3rd, Fraser.
Pullet: 1st, Mrs. Holland ; 2nd, Fraser ; 3rd, Garland & Gillespie.

WHITE MINORCAS.

Cock: 1st, Osborne.
Hen: 1st, Holland ; 2nd, Bastien.
Cockerel: 1st, Bastien.
Pullet: 1st, Osborne ; 2nd, Bastien.

S. C. White Minorcas.

Cock: 1st, McKellar & Magurn; 2nd, Ottawa Poultry Yards; 3rd, Stewart & Son.
Hen: 2nd, Gilbert & Jardine; 2nd and 3rd, McKellar & Magurn.
Cockerel: 1st, 2nd and 3rd, McKellar & Magurn.
Pullet: 1st and 3rd, Gilbert & Jardine; 2nd, McKellar & Magurn.

S. C. Brown Leghorns.

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st and 3rd, Ottawa Poultry Yards; 2nd, Gray.
Cockerel: 1st, Gray; 2nd and 3rd, Stewart & Son.
Pullet: 1st, Bastien; 2nd, Gray; 3rd, Mills.

S. C. Black Leghorns.

Hen: 2nd, Osborne; 3rd, Reid.
Cockerel: 1st and 3rd, Osborne.
Pullet: 1st and 2nd, Osborne; 3rd, Reid.

R. C. Brown Leghorns.

Cock: 1st, Stewart & Son.
Hen: 1st and 3rd, Stewart & Son; 2nd, Oldreive.
Cockerel: 1st, Oldreive; 2nd, Stewart & Son.
Pullet: 1st and 3rd, Oldreive; 2nd, Stewart & Son.

S. C. Buff Leghorns.

Cock: 1st, Driver & Co.
Hen: 1st and 2nd, Driver & Co.; 3rd, Allen.
Cockerel: 1st, Driver & Co.; 2nd, Allen; 3rd, Neilson.
Pullet: 1st and 3rd, Driver & Co.; 2nd, Neilson.

A. O. V. S. Rose Comb Leghorns.

Cock: 1st, Stewart & Co.; 2nd, Mrs. Holland; 3rd, Neilson.
Hen: 1st, Stewart & Co.; 2nd, Allen; 3rd, Neilson.
Cockerel: 1st, Stewart & Co.; 2nd, Neilson; 3rd, Mrs. Holland.
Pullet: 1st, Mrs. Holland; 2nd, Stewart & Son; 3rd, Neilson.

Black Red Game.

Cock: 1st, Oldreive.
Hen: 1st, Oldreive; 2nd, Neilson.
Cockerel: 1st, Oldreive.
Pullet: 1st, Oldreive; 2nd, Neilson.

Brown Red Game.

Cock: 1st, Oldreive.
Hen: 1st, Ottawa Poultry Yards; 2nd Oldreive.
Cockerel: 1st, Ottawa Poultry Yards.
Pullet: 1st, Ottawa Poultry Yards; 3rd, Oldreive.

Duckwing Game.

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st, Ottawa Poultry Yards; 2nd, Oldreive; 3rd, Bastien.
Cockerel: 1st, Bastien.

Pyle Game.

Hen: 1st and 2nd, Ottawa Poultry Yards; 3rd, Oldreive.
Cockerel: 1st, Oldreive.
Pullet: 1st, Oldreive.

Indian Game.

Cock: 1st, Gisborne, 2nd Cumming; 3rd, Neilson.
Hen: 1st and 2nd, Gisborne; 3rd, Cumming.
Cockerel: 1st, Gisborne.
Pullet: 1st, Gisborne; 2nd, Stewart & Son.

A. O. V. or White Indian Game.

Cock: 1st Stewart & Son.

Old English or Pit Game.

Cock: 1st, Benjamin; 2nd, Reid; 3rd, Neilson.
Hen: 1st, Reid; 2nd, Benjamin; 3rd, Neilson.
Cockerel: 1st, Banjamin; 2nd, Neilson; 3rd, Reid.
Pullet: 1st, Benjamin; 2nd, Neilson; 3rd, Reid.

Black Hamburgs (8).

Cock: 1st, Reid.
Hen: 1st and 3rd, Reid; 2nd, Neilson.
Cockerel: 1st, Reid; 2nd, Stewart & Son.
Pullet: 1st, Reid.

SILVER PENCILLED HAMBURGS (14).

Cock: 1st, Ottawa Poultry Yards; 2nd, Neilson; 3rd, Stewart & Son.
Hen: 1st, Ottawa Poultry Yards; 2nd, Neilson; 3rd, Stewart & Son.
Cockerel: 1st, Neilson; 2nd, Stewart & Son; 3rd, Reid.
Pullet: 1st, Stewart & Son; 2nd, Neilson; 3rd, Reid.

GOLDEN SPANGLED HAMBURG.

Cock: 1st, Neilson.
Hen: 1st, Neilson; 2nd and 3rd, Reid.
Cockerel: 1st, Ottawa Poultry Yards; 3rd, Neilson.
Pullet: 1st and 2nd, Ottawa Poultry Yards; 3rd, Neilson.

SILVER SPANGLED HAMBURGS.

Cock: 1st, Ottawa Poultry Yards; 2nd, Stewart & Son; 3rd, Bastien.
Hen: 1st and 2nd, Stewart & Son; 3rd, Bastien.
Cockerel: 1st, Bastien.
Pullet: 1st and 2nd, Ottawa Poultry Yards; 3rd, Stewart & Son.

W. C. BLACK POLISH.

Cock: 1st, Stewart & Son; 3rd, Bastien.
Hen: 1st, Bastien; 2nd, Stewart & Son.
Cockerel: 2nd, Bastien.
Pullet. 1st, Stewart & Son; 2nd, Bastien.

GOLDEN POLISH.

Cock: 1st, Stewart & Son.
Hen: 2nd, Stewart & Son.
Cockerel: 1st Reid.
Pullet: 1st, Stewart & Son; 2nd, Reid.

SILVER POLISH.

Cock: 1st, Stewart & Son.
Hen: 1st, Stewart & Son.

HOUDANS.

Cock: 1st and 2nd, Reid; 3rd, Bastien.
Hen: 1st, Stewart & Son; 2nd and 3rd, Reid.
Cockerel: 1st, Bastien.
Pullet: 1st, Bastien.

RED CAPS.

Cock: 1st, Stewart & Son.
Hen: 1st, Stewart & Son.
Cockerel: 1st, Neilson.
Pullet: 1st Neilson.

A. O. S. V. OF FOWL.

Cockerel: 1st, 2nd and 3rd, Harmer.
Pullet: 1st, 2nd and 3rd, Harmer.

BLACK RED GAME BANTAM

Cock: 1st, Ottawa Poultry Yards.
Hen: 1st, Ottawa Poultry Yards.
Cockerel: 1st, Oldreive; 2nd, Reid.
Pullet: 1st, Oldreive; 2nd, Reid.

BROWN RED GAME BANTAMS.

Cock: 1st, Ottawa Poultry Yards: 2nd, Oldreive.
Hen: 1st, Ottawa Poultry Yards: 2nd, Oldreive.
Pullet: 1st, Ottawa Poultry Yards: 2nd, Oldreive.

DUCKWING GAME BANTAMS.

Cock: 1st, Ottawa Poultry Yards; 2nd, Oldreive.
Hen: 1st, Oldreive.
Cockerel: 1st, Oldreive; 2nd, Reid.
Pullet: 1st, Oldreive; 2nd and 3rd, Ottawa Poultry Yards.

PYLE GAME BANTAMS.

Cock: 1st, Ottawa Poultry Yards; 2nd, Oldreive.
Hen: 1st and 2nd, Ottawa Poultry Yards; 3rd, Oldreive.
Cockerel: 1st and 2nd, Reid.
Pullet. 1st, Oldreive; 2nd and 3rd, Reid.

GOLDEN SEABRIGHT BANTAMS

Cock: 1st, Oldreive; 2nd, Reid; 3rd, Stewart & Son.
Hen: 1st, Oldreive; 2nd, Stewart & Son; 3rd, Reid.
Cockerel: 1st, Oldreive; 2nd and 3rd, Reid.
Pullet: 1st, Oldreive; 2nd and 3rd, Reid.

SILVER SEABRIGHT BANTAMS.

Cock: 1st, Reid.
Hen: 1st, Reid.
Cockerel: 1st, Reid.
Pullet: 1st and 2nd, Reid.

BLACK R. C. BANTAMS.

Cock: 1st, Oldreive; 2nd, Reid.
Hen: 1st and 2nd, Reid; 3rd, Oldreive.
Cockerel: 1st and 2nd, Reid.
Pullet: 1st, Oldreive; 2nd and 3rd, Reid.

BUFF COCHIN BANTAMS.

Cock: 1st, McKenzie; 2nd, Reid.
Hen: 1st and 2nd, Reid.
Cockerel: 1st, Reid; 2nd and 3rd, McKenzie.
Pullet: 1st and 2nd, Beeson; 3rd, Reid.

BLACK AND WHITE COCHIN.

Cock: 1st, McKenzie.
Hen: 1st, Ottawa Poultry Yards; 2nd, Reid; 3rd, McKenzie.
Cockerel: 1st and 2nd, Reid; 3rd, Beeson.
Pullet: 1st and 2nd, Beeson; 3rd, Reid.

JAPANESE BANTAMS.

Cock: 1st, Reid.
Hen: 1st and 2nd, Reid.
Pullet: 1st, Reid.

A. O. V. BANTAMS.

Cock: 1st, Reid.
Hen: 1st and 2nd, Reid.

BRONZE TURKEYS.

Cock: 1st and 3rd, Cumming; 2nd, Stewart & Son.
Hen: 1st and 2nd, Cumming; 3rd, Stewart & Son.
Cockerel: 1st, Thompson; 2nd 3rd, Cumming.
Pullet: 1st and 3rd, Cumming; 2nd, Thompson.

A. O. V. TURKEYS.

Cock: 1st, Cumming.
Hen: 1st, Thompson; 2nd, Cumming.
Cockerel: 1st, Cumming.
Pullet: 1st, Thompson; 2nd, Cumming.

TOULOUSE GEESE.

Gander: 1st, Thompson; 2nd. Cumming; 3rd, Ottawa Poultry Yards.
Goose: 1st, Thompson; 2nd, Cumming; 3rd, Ottawa Poultry Yards.
Gander for 1900: 1st, Cumming.
Goose for 1900: 1st, Cumming.

EMBDEN GEESE.

Gander: 1st, Thompson; 2nd, Cumming; 3rd, Ottawa Poultry Yards.
Goose: 1st, Thompson; 2nd, Cumming.
Gander for 1900: 1st, Cumming; 2nd, Thompson.
Goose for 1900: 1st, Thompson.

CHINA GEESE.

Gander: 1st, Cumming; 2nd, Ottawa Poultry Yards; 3rd, Stewart & Son.
Goose: 1st, Cumming; 2nd, Ottawa Poultry Yards; 3rd, Stewart & Son.
Gander for 1901: 1st, Cumming.
Goose of 1900: 1st and 2nd, Cumming.

A. O. V. GEESE.

Gander: 1st, Thompson.
Goose: 1st, Thompson.

PEKIN DUCKS.

Drake: 1st, Cumming; 2nd, Neilson.
Duck: 1st, Cumming; 2nd, Neilson.
Drake of 1900: 1st, Reid; 2nd, Neilson.
Duck of 1900: 1st, Reid.

ROUEN DUCKS.

Drake: 1st, Stewart & Son; 2nd, Cumming; 3rd, Neilson.
Duck: 1st, Reid; 2nd, Neilson; 3rd, Cumming.
Drake of 1900: 1st, Stewart & Son; 2nd, Cumming; 3rd, Neilson.
Duck of 1900: 1st, Reid; 2nd, Cumming; 3rd, Neilson.

AYLESBURY DUCKS.

Drake: 1st, Reid; 2nd, Stewart & Son.
Duck: 1st. Reid; 2nd, Stewart & Son; 3rd, Ottawa Poultry Yards.
Drake of 1900: 1st and 2nd, Reid; 3rd, Cumming.
Duck of 1900: 1st, Reid; 2nd, Cumming; 3rd, Stewart & Son.

CAYUGA DUCKS.

Drake. 1st, Ottawa Poultry Yards; 2nd, Reid; 3rd, Stewart & Son.
Duck: 1st, Neilson; 2nd, Cumming; 3rd, Ottawa Poultry Yards.
Drake of 1900: 1st, Reid; 2nd, Cumming.
Drake of 1900: 1st, Reid; 2nd, Cumming; 3rd, Neilson.

A. O. V. OF DUCKS.

Drake: 1st, Ottawa Poultry Yards.
Drake of 1900. 1st, Miss E. J. Darling.
Duck of 1900: 1st, Miss E. J. Darling.

FARMERS' CLASSES: FOR THE BEST PEN OF BIRDS CONSISTING OF A MALE AND THREE FEMALES RAISED AND EXHIBITED BY A FARMER.

HEAVY BREED FOR GENERAL PURPOSES.

1st, Mrs. H. B. Billings; White Plymouth Rocks.
2nd, Stewart & Son; Barred Plymouth Rocks.
3rd, Cumming; Light Brahmas.

LIGHT BREED FOR EGGS.

1st, Fraser; Black Minorcas.
2nd, Stewart & Son; Black Minorcas.
3rd, Cumming; Black Minorcas.

BEST DOZEN WHITE EGGS.

1st, Anderson.
2nd, Mrs. Holland.
3rd, Cumming.
4th, Allen.

BEST DOZEN COLORED EGGS.

1st, Mrs. Yuill.
2nd, Mrs. Holland.
3rd and 4th, Allen.

PAIR GUINEA FOWL.

1st, Stewart & Son.

AMATEUR CLASS: OPEN TO THOSE ONLY WHO HAVE NEVER WON A FIRST PRIZE.

PLYMOUTH ROCK.

Cock: 1st, Mrs. Haig; 2nd and 3rd, Mrs. Billings.
Hen: 1st, Mrs. Haig; 2nd and 3rd, Mrs. Billings.
Cockerel: 1st, Mrs. Billings; 2nd, Frith; 3rd, Mrs. Haig.
Pullet: 1st, Mrs. Billings; 2nd, Frith.

LEGHORNS.

Cock: 1st Mrs. Billings; 2nd, Mrs. Haig.
Hen: 1st Mrs. Billings; 2nd, Mrs. Haig.
Cockerel: 1st, Mrs. Haig; 2nd Mrs. Billings.
Pullet: 1st, Mrs. Billings; 2nd, Mrs. Haig.

WYANDOTTES.

Cock: 1st, Mrs. Billings; 2nd, Steele; 3rd, Mrs. Haig.
Hen: 1st, Steele; 2nd Mrs. Haig; 3rd, Mrs Billings.
Cockerel: 1st, Steele; 2nd and 3rd, Mrs. Billings.
Pullet: 1st and 2nd, Steele; 3rd, Mrs. Haig.

MINORCAS.

Cock: 1st, Mrs. Haig.
Hen: 1st, Mrs. Haig.
Cockerel: 1st, Anderson.
Pullet: 1st, Anderson.

A.O.V. OF FOWL.

Cock: 1st Mrs. Billings; 2nd. Mrs. Haig.
Hen: 1st and 2nd, Billings.
Cockerel: 1st, Anderson; 2nd, Mrs. Haig.
Pullet: 1st, Anderson; 2nd, Mrs. Haig.

PIGEONS.

WHITE POUTERS.

Cock: 1st and 2nd, Ottawa Pigeon Lofts.
Hen: 1st, Reid.

BLACK AND BLUE POUTERS.

Cock: 1st, Reid.
Hen: 1st, Reid.

A.O.V. POUTERS.

Cock: 1st, Reid.
Hen: 1st, Reid.

CARRIERS ANY COLOR.

Cock: 1st, McPhee.
Hen: 1st, McPhee; 2nd, Reid.

BARBS ANY COLOR.

Cock: 1st, Ottawa Pigeon Lofts.
Hen: 1st, Reid.

JACOBINS RED OR YELLOW.

Cock: 1st, McPhee; 2nd, Ottawa Pigeon Lofts; 3rd, Reid.
Hen: 1st, Ottawa Pigeon Lofts; 2nd, McPhee; 3rd, Higman.

JACOBINS WHITE.

Cock: 1st, Ottawa Pigeon Lofts. *Hen*: 1st, Ottawa Pigeon Lofts.

JACOBINS A.O.C.

Cock: 1st, McPhee ; 2nd, Reid. *Hen*: 1st, McPhee ; 2nd, Reid.

FAN TAILS WHITE.

Cock: 1st, Reid. *Hen*: 1st, Reid.

TRUMPETERS.

Cock: 1st, Reid.

TRUMPETERS SHORT FACED.

Cock: 1st, Mc Phee ; 2nd, Reid. *Hen*: 1st, McPhee ; 2nd, Reid.

TRUMPETERS LONG FACED CLEAN LEGGED.

Cock: 1st, Ottawa Poultry Yards ; 2nd, Reid. *Hen*: 1st, Reid ; 2nd, Ottawa Pigeon Lofts.

TRUMPETERS BOOTED.

Cock: 1st and 2nd, Reid ; 3rd, Ottawa Pigeon Lofts. *Hen*: 1st, Ottawa Pigeon Lofts ; 2nd, Reid

ANTWERPS.

Cock: 1st and 2nd, McPhee. *Hen*: 1st and 2nd, McPhee.

TURBITS RED OR YELLOW.

Cock: 1st and 2nd, Ottawa Pigeon Lofts. *Hen*: 1st and 2nd, Ottawa Pigeon Lofts.

TURBITS BLUE OR BLACK.

Cock: 1st and 2nd, Ottawa Pigeon Lofts. *Hen*: 1st and 2nd, Ottawa Pigeon Lofts.

TURBITS A.O.C.

Hen: 1st, Ottawa Pigeon Lofts.

OWLS ENGLISH CHEQUERED.

Cock: 1st, Ottawa Pigeon Lofts.

OWLS ENGLISH A.O.C.

Cock: 1st, Reid. *Hen*: 1st, Reid.

OWLS AFRICAN.

Cock: 1st, Ottawa Pigeon Lofts : 2nd, Reid ; 3rd, McPhee.
Hen: 1st, Ottawa Pigeon Lofts ; 2nd, Reid ; 3rd, McPhee.

SWALLOWS RED OR YELLOW.

Cock: 1st, McPhee. *Hen*: 1st, McPhee.

SWALLOWS A.O.C.

Cock: 1st, McPhee. *Hen*: 1st, McPhee.

ARCHANGELS.

Cock: Ottawa Pigeon Lofts ; 2nd, Reid. *Hen*: 1st, Reid ; 2nd, McPhee.

MAGPIES BLACK.

Cock: 1st and 2nd, Ottawa Pigeon Lofts. *Hen*: 1st and 2rd, Ottawa Pigeon Lofts.

MAGPIES RED.

Cock: 1st, Ottawa Pigeon Lofts ; 2nd, Reid. *Hen*: 1st, Ottawa Pigeon Lofts ; 2nd, Reid.

NUNS.

Cock: 1st, Ottawa Pigeon Lofts. *Hen*. 1st, Ottawa Pigeon Lofts ; 2nd, Reid.

DRAGOONS SILVER.

Cock: 1st, Ottawa Pigeon Lofts. *Hen*: 1st, Ottawa Pigeon Lofts.

DRAGOONS A.O.C.

Cock: 1st, Ottawa Pigeon Lofts. *Hen*: 1st, Ottawa Pigeon Lofts.

SHOW HOMERS.

Cock: 1st and 2nd, McPhee. *Hen*: 1st and 2nd, McPhee.

MOST LIKELY LOOKING FLYING HOMER.

Cock: 1st, Ottawa Pigeon Lofts ; 2nd, Reid ; 3rd, McPhee.
Hen: 1st, Ottawa Pigeon Lofts ; 2nd, Reid ; 3rd, McPhee.

A.O.V. PIGEON.

Cock: 1st, Ottawa Poultry Lofts ; 2nd, Reid. *Hen*: 1st, Reid.

ANNUAL REPORTS

OF THE

DAIRYMEN'S ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1900.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.
DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.
THE DAIRY SCHOOLS OF ONTARIO.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
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Printer to the King's Most Excellent Majesty,
1901.

By Secs. 5 and 6 of Chap. 17 of the Ontario Statutes for 1900, the names of the two Associations known as the Cheese and Butter Associations of Ontario are changed to, and will hereafter be known as, *The Dairymen's Association of Eastern Ontario* and *The Dairymen's Association of Western Ontario.*

WARWICK BRO'S & RUTTER, PRINTERS,
TORONTO.

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OFFICERS FOR 1901.

President.....D. Derbyshire, Brockville.
1st Vice-President.....John McTavish, Vancamp.
2nd Vice-President.....L. L. Gallagher, Wilton.
3rd Vice-President.....John Echlin, Carleton Place.
Secretary.....R. G. Murphy, Elgin.
Treasurer.....P. R. Daly, Foxboro'.
Auditors.....Morden Bird, Stirling.
F. W. Brenton, Belleville.

Directors:

Division No. 1—Edward Kidd, North Gower.
" 2—Wm. Eager, Morrisburg.
" 3—J. R. Dargavel, Elgin.
" 4—James Whitton, Wellman's Corners.
" 5—T. B. Carlaw, Warkworth.
" 6—Henry Wade, Toronto.

Instructors:

G. G. Publow.....Perth.
L. A. Zufelt.....Chesterville.
A. P. Purvis.....Maxville.
John B. Lowery.....Frankford.
J. H. Bensley.....Warkworth.
John Kerr.....Stirling.
Hugh Howey.....Newburg.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

ANNUAL MEETING.

The twenty-fourth annual meeting of the Dairymen's Association of Eastern Ontario was held at Smith's Falls on the 9th, 10th and 11th of January, 1901. All the sessions were well attended, and the keenest interest was manifested in the addresses and discussions. The presence of Lord and Lady Minto on the afternoon of the first day lent an additional interest to the gathering. On that occasion the crowd was so great that the Opera House, in which the meetings of the Association were held, was unable to accommodate the throng, and hundreds were forced to remain outside. The decorations of the building reflected much credit upon the energy and taste of the local committee, led by Mr. M. K. Everetts.

The first session opened at 10.30 a.m., when the President delivered the following address :

PRESIDENT'S ADDRESS.

By D. Derbyshire, Brockville.

It is a great pleasure to meet with the citizens of Smith's Falls and the dairymen of this important section, and I desire, on behalf of our Board, to thank you all for your cordial reception. I am delighted that the Governor-General of Canada has kindly consented to open this 24th annual convention and show his hearty sympathy with the great work we have on hand, that of making a finer quality and a larger quantity of butter and cheese in Eastern Ontario each year, and placing it on the British market in nicer condition.

This is the first important dairymen's meeting in the new century, and I do hope we will study well the great problems before us, and devise the very best means for the future. I trust all our friends will enter heartily into this, and I feel sure, from past experience, you will. For nearly a quarter of a century we have worked unitedly, making steady advancement, and I am glad to say 1900 was the most prosperous year for our dairymen in our history. We have moulded public opinion in this Province until our Government appointed a Minister of Agriculture specially charged with the development of agriculture in all departments ; we secured the appointment of a Dairy Commissioner who has rendered excellent service for the whole Dominion ; Dairy Schools and Farmers' Institutes are some of our handiwork. So our Association, with our sister associations, have been active agencies for the bettering of the conditions of our fellow Canadians. We have made the name of Canada famous throughout the world. At the World's Fair in in Chicago, in 1893, we carried off 95 per cent. of all the prizes for fancy cheese, and at every important exhibition we have done a like service for this country. Dairying is far different now to what is was at the time this Association was formed, and the eyes of the producing (butter and cheese) world is upon us, and we must commence this new century with a determination to excel in everything that pertains to our industry.

With our present opportunities for education and instruction there will be no excuse for any factory employing an ordinary maker, having an old, open or poor factory or not having modern machinery with every facility for making the finest goods, for no business in this country rests on a more solid foundation. We want every dairyman in this country to promise not to keep an ordinary cow, nor have an ordinary stable, but to commence now to weed out every animal not profitable ; to have the stable the best, well lighted, warm, properly ventilated, with the very best healthful food, plenty of pure water ; everything around the stable clean and neat so that the milk produced will be the best.

Then we will not only be able to produce the finest quality, which is the most important, but also cheapen the cost of production, which is being so carefully studied by all. No industry in our country can overlook cheaper production. We must understand that no healthy or finest quality of milk can be produced from animals housed in dark, damp and unclean stables, with poor food and worse attendance, and the sooner we all get this thoroughly impressed on our minds and change our ideas, the sooner we will all be placed in a position for making money. It will surprise you to know that fully one-third of our dairymen are not making money, nor have they the facilities for doing the best work and apparently do not care. Was there ever a time more appropriate for turning over a new leaf than to-day, the commencement of a new century, and at this joyous season when we are all forming new resolutions, let us resolve to day to keep only the best cows, have only the best stables, and have a silo or two Do your best to show yourself worthy of this great heritage and the many advantages that surround you. It may surprise you to know that we did not produce as much milk in 1900 as we did in 1899. While our exports of cheese, from the 1st of May to the 1st of November, were 2,077,000 boxes, and the stocks on hand, the make of 1900, were 323,000, making 2,400,000 available for export for the season, which will bring $2,500,000 more than in 1899, still our exports of butter will be $2,000,000 less than in 1899. This is only a gain of $500,000 on the season's make, with the highest prices throughout the season on record. I am very sorry that we did not make more butter. There is more room for expansion in butter than in cheese. We have sixty per cent. of the cheese trade with the mother country and only seven per cent. of the butter, which is nothing like a fair proportion. Considering our facilities let us push hard for our fair share of this important trade, which is ours if we only persevere. Our butter and cheese for 1900 will bring the nice sum of $25,000,000,—$20,000,000 for cheese and $5,000,000 for butter. I do hope our make in 1901 will be $22,500,000 for cheese and $7,500,000 for butter, which would make our product realize $30,000,000 for the year upon which we have entered. This can be done by intelligent care by all concerned, and it would make all our hearts rejoice at our next annual meeting, besides bringing prosperity to every industry in our land.

Of course our home consumption has greatly increased, and will become quite a factor later with our improved quality. We should not make winter cheese, but turn our attention to finest butter from November till May, in cheese sections. It would equalize our product ; keep off the market goods that are not fancy, and we would have nearly as much money and a better reputation by so doing. This Association must use its influence with our railways to secure quicker transportation, in clean, well ventilated cheese cars, and lower freight rates. It is perfectly awful to have cheese two or three days along the railway, in some miserable old open coal car, and expect it to bring top money, when it has been greatly depreciated in transit, in some cases two cents a pound. This must be remedied this year. We must carry on our work of education and instruction more earnestly this season than ever in our history. We must make fancy goods, and better than ever before, if we expect to hold the prominent place we have in the past. We must have hearty co-operation among patrons, makers, and all concerned, to enable us to place on the market the fancy quality desired ; neater style, everything better, so we can easily take another step in the advance of all our competitors in every part of the world.

Our excellent staff of instructors have done their work very satisfactorily. Hon. Mr. Dryden, our Minister of Agriculture, came to our aid with a larger grant, besides aiding us in every possible way. Hon. Mr. Fisher has enlarged and improved our refrigerator service on the railways and steamships, besides giving us his hearty co-operation. Prof. Robertson and his assistant, Prof. Ruddick have rendered invaluable service to our dairymen. The secretary and treasurer have done their work well.

I have looked forward to this 24th annual convention to be held in your enterprising town with great pleasure. You have made great advancement in a few short years. Your schools, churches and public buildings are all that can be desired. Your merchants and manufacturers are among the foremost. Of all this you, I am sure, are justly proud, but the dairymen propose to draw your attention to your greatest industry in this country, and capable of great expansion—I mean the dairy business. Do not be mistaken about the term dairyman. The term dairyman mean a farmer who cultivates his farm exactly the same as a grain farmer does, only he does it more intelligently, and feeds his crops to his cows, pigs, etc., instead of selling them, and makes twice the money. In

short, he becomes a manufacturer, besides saving all his fertility to grow better crops each succeeding season. Then the dairyman who works intelligently is the hope of our country.

Once more let me urge all to work unitedly, with only one object in view, the building up and extending of this great national industry. We extend a hearty New Year's greeting to sister associations, and trust 1901 will be what we all desire—the most successful in the history of our Dominion.

COMMITTEES.

The following committees were then appointed :

Business—Mayor Farrell, M. K. Everetts, and R. G. Murphy.
Nominations—James Whitton, J. R. Dargavel, and Wm. Eager.
Legislation—Wm. Eager, M. K. Everetts, and R. G. Murphy.

AUDITOR'S REPORT.

On motion of Mr. MORDEN BIRD, seconded by Mr. WM. EAGER, the following report of the Auditors was received and adopted :

STATEMENT OF RECEIPTS AND EXPENDITURES OF P. R. DALY, ESQ., TREASURER DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

RECEIPTS.		EXPENDITURES.	
To cash on hand since last audit	$ 396 95	By Expenses annual meeting, 1900	$ 564 40
" Membership fees	354 00	" Reporter	100 00
" Advertisements	188 00	" Printing	738 76
" Legislative grant	4,000 00	" Two Advisory Board meetings, Toronto	370 00
" Windsor Salt Co	100 00	" Local committee meeting, Madoc	45 00
" Prosecutions	1,695 50	" Postage and telegraph	16 75
" Fees from factorymen	3,133 00	" Local committee meeting, Belleville	91 03
		" Officers' salaries	190 00
		" Grant Industrial and Fat Stock Show	100 00
		" J. W. Newman, Brockville, 1st Prize Essay on Butter	50 00
		" J. W. Livingstone, Pembroke, 2nd Prize Essay on Butter	25 00
		" R. W. Thompson, Springbrook, 1st Prize Essay on Cheese	50 00
		" Anson Dunlop, Roebuck, 2nd Prize Essay on Cheese	25 00
		" Acid for Inspectors	63 00
		" Hugh Howey, salary and expenses	781 27
		" G. H. Bensley, " "	785 00
		" J. R. Lowry, " "	825 00
		" R. W. Ward, " "	809 72
		" L. A. Zufelt, " "	960 00
		" G. G. Publow, " "	948 00
		" A. P. Purvis, " "	1,044 00
		" Expense Annual Convention, 1901	535 00
		" Balance on hand	1,350 52
	$9,867 45		$9,867 45

We, the undersigned hereby certify that we have examined the accounts and vouchers of P. R. Daly, Esq., Treasurer of Dairymen's Association of Eastern Ontario, and find them correct in accordance with above statement.

MORDEN BIRD,
F. W. BRENTON, } Auditors.

WORDS OF WELCOME.

The Mayor, Mr. A. Grey Farrell, then took the chair, and after cordially welcoming the Association to Smith's Falls, called upon the chairman of the Local Committee, Mr. M. K Everttts, for a few words.

Mr. Everttts: I am pleased to have the honor of welcoming the members of the Association to Smith's Falls. You are engaged in a most important work, and one on which the prosperity of the country largely depends. I think the President has given us a capital presentation of the subject in his address. We will have the Governor-General here this afternoon. He is to meet us as farmers, and we will also meet him as one. We have also with us a brother dairyman from the adjoining Province of Quebec. He is President of the Bedford District Dairy Association, and has high standing among the dairymen of Quebec.

Mr. H S. Foster was also introduced by the President as one of the most successful dairymen of the Eastern Townships, He said: I want to thank Mr. Everttts and the President for their kind words. I have always looked upon the people of Ontario as the pioneers and leaders of the dairy industry. In the Eastern Townships of Quebec we have made considerable advancement, although on the average we perhaps do not come up to your Province. The dairymen of both Ontario and Quebec should co-operate, working together for the building up of the dairy industry, and putting it on the soundest basis. (Applause.) I was glad to hear the President talk about the need of better stabling and ventilation, and also on the question of a longer period of lactation for the cow. We are boarding too many cows for four or five months in the year. We should also co-operate in the matter of getting better freight rates from the railways. (Applause.)

ADDRESS TO LORD MINTO.

The President, Mr. D. Derbyshire, read the following address to Lord Minto, and presented the Governor-General with a handsomely engrossed copy of the same:

To His Excellency the Right Honorable the Earl of Minto, G. C. M. G, Governor General of Canada, etc.

May it Please Your Excellency:

We, the officers and members of the Dairymen's Association of Eastern Ontario, desire to express to you our hearty appreciation of the great honor you have conferred upon us by consenting to open this, our twenty-fourth annual convention, in this enterprising town of Smith's Falls.

The industry we represent is one of the greatest in Canada. Our butter and cheese made in 1900, when exported to the Mother Country from the Dominion, will realize over $25,000,000. We not only make the finest butter and cheese in Eastern Ontario, but this is the original home of modern dairying in Canada. As dairymen and citizens of this fair Dominion, we attest our loyalty and devotion to the Empire and person of Her Gracious Majesty Queen Victoria, and to you her representative The past year has marked an important epoch in the history of the British Empire, and the tie that binds the colonies to the motherland has been further cemented by the blood of our brave sons on the South African veldt. To Your Excellency, yourself a gallant soldier, has been given the honor of representing Her Majesty in Canada during this illustrious period. We have watched with pride your course, as you played well your part in the strengthening of these ties, and our sincere desire is that Your Excellency will become an honorary member of our Association.

We all most sincerely wish Your Excellency the compliments of the season, and trust your stay in Canada may be one of continued happiness.

D. Derbyshire, *President.*

LORD MINTO'S REPLY.

The Governor-General on rising was heartily applauded, and delivered the following speech in reply to the address presented to him :

Mr. Derbyshire, officers and members of the Dairy Association of Eastern Ontario :

I beg to thank you sincerely for the hearty welcome you have given me to Smith's Falls, and for the much too flattering terms of your address. I assure you it is a great pleasure to me to have an opportunity of paying a visit—though only a flying visit—to Smith's Falls, which, since I was in Canada some fifteen years ago, has become an important railway station and a divisional point of the C.P.R., and is rapidly increasing as a trade centre. Smith's Falls is essentially a manufacturing town, possessing a population inspired with that spirit of energy and competition which has ensured the success of so many great cities, and I congratulate you, gentlemen, on being able to celebrate your annual convention where so many advantages exist for the furtherance of that industry of Eastern Ontario, with which you are especially connected.

I am afraid, gentlemen, that I cannot claim in the smallest degree to be an expert in dairy-farming. I come from a great sheep country—the borders of Scotland—much of it is as wild as the great ranches of the Northwest, but where—(I hope there are no Borderers here to tell tales of me at home)—dairy-farming in its scientific sense, is in its infancy, and where I often wished it were better understood. So that I come amongst you as a pupil, and I hope I may say a pupil anxious to profit by all you may tell him or show him But at the same time to any one who watches generally the ever increasing trade of Canada, and the bright promises of the future, it is impossible to help being impressed by the great strides which have been made in dairy-farming.

It would, I think, be out of place for me, in answer to your address of welcome, to attempt to deal with the many statistics which go to prove the advance which has been made. You have earned successes which have been patent to the whole world. At the World's Fair in Chicago in 1893 the dairy products of Canada gained a larger number of awards and medals than were won by the exhibits of all the other countries put together, whilst at the recent Paris Exhibition the grand prize, which is the highest possible award, went to the cheese and butter of Canada.

If you will allow me, however, I should like to quote the following figures, which may serve briefly to indicate the immense advance which has been made in the last ten years, and with which Professor Robertson of the Agricultural Department has kindly supplied me.

In 1891 the number of cheese factories and creameries in Canada was 1,733 ; in 1899 they numbered 3,645. And as regards a still more valuable indication of improvement, I find that in 1890 the value of exports in cheese was $9,372,212, and in 1900, $19,856,-324, or an advance of considerably over ten million dollars in ten years.

Again, the export of butter, though it has not nearly approached that of cheese, shows a wonderful increase. In 1890 the value of butter exported was $340,131, while in 1900 in was $5,122,156.

I need not tell you that there are many other figures available which tend to the same conclusion. In my humble opinion, gentlemen, the Association which you represent has conferred a great benefit on the public by its endeavors to further the success of this important trade. Your annual convention encourages the discussion by experts of the best means for the development of that trade in which they are interested. In the present day everything goes to prove that in the world-wide competition which exists the products of trade must owe their success to a study of detail and technical knowledge. You afford your members the opportunity of discussing the means by which that knowledge can best be utilized, and you consider at your meetings not only the value of the most productive farm stock, but the great questions of cheap production, available markets and transportation. The co-operative system, with the assistance it has derived from the Agricultural Department, under the able direction of Mr. Sydney Fisher has, I believe, done very much to raise the hopes of the farming community of Canada—a community which, as far as I can see, is likely to take the lead in indicating to other nations the most practical means of bringing to bear on farming the discoveries and mechanical inventions of the present day.

You have one very great advantage, gentlemen. You, as the farmers of a new country, can profit by the mistakes and experiences of the old world. Farmers, in my experience, are perhaps rather prone to be tied by tradition—perhaps you may scatter old-world traditions to to the winds. At any rate, gentlemen, I congratulate you on the great success of the dairy industry and I feel that your Association can well be proud of the result of that technical knowledge, the study of which it has done so much to encourage. (Applause).

Mayor FARRELL then welcomed Lord and Lady Minto on behalf of the people of Smith's Falls. He remarked that the only other Governor-General who visited the town was Lord Dufferin. He complimented His Excellency on his fine military record, more especially on his connection with the stamping out of the rebellion in 1885. The Mayor regretted that the stay of Lord and Lady Minto was to be so brief, as there were many points of interest, and some of them closely connected with agriculture, that he would like to have the honor of showing them.

At the conclusion of the Mayor's address the audience rose and gave three rousing cheers for Lord and Lady Minto, who appeared to be delighted with their cordial reception. Their Excellencies then retired, and the regular business of the Convention was proceeded with.

THE HAND CREAM SEPARATOR.

BY PROF. H. H. DEAN, O.A.C., GUELPH, ONT.

The topic upon which I am to speak is "The Hand Separator." You heard the President state this morning that the butter industry had not increased at the same ratio as our cheese. Such a statement should make us consider the position carefully. The butter business requires more attention than ever, and more careful handling by dairymen. Our cheese trade has thriven marvellously, but it is important that more attention should be given to the butter branch than it now receives, if it is also to make a full measure of progress. The origin of the hand separator occurred this way: Man desired cream—as he desires the cream of everything else if he can get it—and in order to get the cream off the milk various methods and machines were devised. It was observed at first that by natural process cream rose slowly to the top of the milk. But man is an impatient creature, and he wanted it to come more quickly; as, indeed, he wants everything else to come. The old method—the natural way for cream to come—was by gravitation. The method of the separator is called centrifugal. Gravitation is a force of nature, and man got that free; and, like the small boy, he would like to get everything else "free gratis for nothing." But that which was free was slow, and so man had to apply the other force known as centrifugal, which means flying away from the centre. Although this force was in existence the world over for centuries, it was not until 1876 that it was applied to the dairy business. The first cream separator was a horizontal bar resting on a centre, on the ends of which were hung pails of milk. Then these were revolved rapidly, bringing the cream more quickly to the surface. However, the cream had then to be skimmed as in the case of pans or deep setting cans. Even that was too slow. One of the greatest difficulties was to get a continuous stream of milk into the separator, and a continuous stream of skim-milk and cream out of it. This was accomplished, however; yet the cream separator of to-day is a clumsy, expensive machine. It is possible that during this present century we shall discover methods of creaming milk much more simple than these we have to-day.

There are two essentials in a first-class hand separator: the bowl, and the gearing to revolve it. When a bowl twelve inches in diameter is revolving 7,000 times in a minute there is a power in that bowl tending to tear it apart equal to twenty-one tons to every square inch. Just consider that fact. The boys come to the College and Dairy School with a good deal of spirit and energy, and they get hold of the crank of a hand separator, and I soon begin to fear that that separator will burst into a hundred pieces and give our local undertakers a job. (Laughter). Scientific men tell us that the best cast-iron, free from flaws, has a tensile strength equal to nine tons to the square inch. The very best forged steel has a tensile strength of only twenty-one tons per square inch, and

hence only the very best forged steel can be used in making a separator bowl. If anything else were used for this purpose the bowl would fly in pieces.

There are two ways of increasing the capacity of a separator: by increasing the diameter of the bowl, and by increasing the speed of it. If you double the diameter of the bowl you will double the centrifugal force; but if you double the speed you will quadruple the force. And for this reason manufacturers have been trying to increase the speed of their machines or place devices on the inside of the bowl to increase its capacity.

Now, what are the main requisites in a hand separator?

1. In must be easy to run.

2. It must have a capacity of from 350 to 500 pounds of milk per hour.

3. It must skim closely. Let me emphasize that point here. The fat which forms the cream is in the milk in the form of tiny globules. The larger of these will separate at a comparatively low speed, but the smaller ones require a very high rate in order to separate from the milk. With inferior separators there is a tendency for the cream to cling to the skimmilk on this account.

4. The gearing and other wearing parts must be simple, and be easily repaired.

5. The machine should not cost more than $100.

6. Have a strong person to turn the hand separator. See that your wife is strong and muscular, and so provide for when you are away from home—as you often will be if you have a hand separator to turn. (Laughter.) I would say to the dairy women present, do not turn a hand separator, or else your husband will be a widower before long, and he will have another wife soon after you are gone. See that your husband, or a robust hired man, does all the turning the hand separator requires. (Applause.)

One of the chief advantages of a hand separator in the private dairy is that it is a cleanser of milk. If you will take what is supposed to be clean milk and run it through a separator, you will be amazed at what will come out of the milk. This is an important factor in favor of the use of separators, as the cleaner and purer cream means better butter. A second advantage is that it enables the private dairyman to get more of this better class of cream, and thus make more and better butter.

A third gain to the farmer is that it gives him a better quality of skimmilk. I want to pause here and emphasize this matter of skimmilk. In our own particular locality we have a number of farmers who make a specialty of stock raising; in fact, the county of Wellington is famous for that. These men near us always want to know if we can return them good skimmilk. We say to them that we can return good skimmilk if they will furnish us with clean, sweet whole milk, but that if they send us sour whole milk we cannot return them good skimmilk. This year we adopted the following plan: We pasteurized all the whole milk before putting it through the separator. That is, we heated the milk to temperatures from 160 to 200 degrees, and after the skimmilk came through the separator we ran it directly over a Lister cooler, connected with our waterworks, and cooled it to 60 degrees. By this method we were enabled to return a good quality of skimmilk even in the hottest weather, when the whole milk came to us in sweet condition. We found that this skimmilk could be kept sweet from 24 to 48 hours by placing the cans of skimmilk in cold water. You may adopt this plan, or, if you prefer, heat the skimmilk to 160 degrees, and then cool it to 60 degrees, and you will be almost sure to get good sweet skimmilk to return to the patrons. I find that a great many of the stockmen around Guelph have bought hand separators, because in previous years they found it difficult to get good skimmilk from the creamery. I know, too, that farmers do not care to sell milk when they have a hand separator.

Another place where a hand separator is valuable is in connection with the cream-gathering creamery. In the east here you have not any of this class of creameries, but in the western and northern parts of the Province there are many of these cream-gathering establishments. On this account the number of hand separators in use is great, and the prospect is so encouraging from the manufacturer's point of view that in our own city of Guelph, a place of 12,000 inhabitants, two factories are now being put up for the manufacture of these separators, one of these concerns investing $30,000 in the enterprise, and the other about $30,000. They expect to find patronage in the cream gathering sections, and in those districts where farmers are raising beefing cattle. One gentleman engaged in the business told me that he had an order for six hundred hand separators, chiefly to go to Manitoba and the North-west.

Now for some of the evils of the hand separator. A recent writer in a leading American dairy journal has said that the use of hand separators tends to lower the grade of butter. The Victoria Government recently appointed a Board of Enquiry into this matter, as their Australian butter was said to have deteriorated in quality. This Board came to the conclusion that there were two main reasons for the deterioration : first, that it was caused by the use of the hand separator, and second, that creameries were gathering cream but once and twice a week. Now, that being the case in Australia, how is it likely to affect us here in Canada? I would say in the first place, that the use of the hand separator is bound to stimulate the private dairy system, until we fill our local markets with good dairy butter. We shall, I think, see a marked demand for hand separators until every town and village in Canada shall be given first-class butter. But after we have filled our local markets what are we then to do with the butter made in the private dairies, even though they may use hand separators? I think the time is not far distant when we shall find, as we did a few years ago, a hundred different kinds of butter on the market, lacking that uniformity that even the finest butter must have to make it acceptable for the export trade.

Creamery men are often dissatisfied with cream from hand separators. We have had to refuse cream from some who used hand separators, as to mix that with our cream would deteriorate the quality. Too many private dairymen think that it is enough that the cream has been run through the separator. Some of them seem to think that it is not necessary to wash the machine more than once a week, but that is a serious mistake The effect of such practice will ruin the quality of the butter made from that cream A great many diarymen who use hand separators take the warm cream from the separator and put it in with the cream that has been skimmed in the morning or the previous day. That practice will result in a poor quality of butter every time. Cream from the separator should always be cooled at once to a temperature of 60 degrees, or lower, otherwise it will be worse for butter-making than that obtained in the old way without separators. Neglecting to wash the machine properly, and neglecting to cool the cream properly, are the two great evils to guard against in the use of the hand separator. If these two points are carefully observed we shall have a better quality of cream, but not otherwise.

The extra expense and labor of running a hand separator must also be considered, especially in those districts where there is a whole milk creamery. In such a district, if one hundred patrons have purchased separators at, say $75, that means an outlay of $7,500. That amount would equip a good up to-date creamery, and leave a fair margin to come and go on. And such a modern creamery would easily handle all the milk these one hundred patrons could supply, and make a much better and more uniform class of butter at the same time. It will take about two hours for a man to run 400 to 500 lbs. of milk daily through a hand separator, and to clean the machine. This at ten cents an hour would mean $1.40 a week, or $72.80 a year. Now for that same amount of money a man could haul 400 to 500 lbs. of milk regularly to the creamery, where the distance is not too great, and there would be the saving of the carrying of the cream to the factory. So where there is a whole milk factory it does not pay to use hand separators, either from the patrons' standpoint, or from that of the maker. Unless we are careful we shall find ourselves in the same position that the Australian people find themselves to day. To use hand separators where whole milk creameries are established cannot but result in the deterioration of Canadian butter. Of course, if there is no whole milk creamery in the neighborhood it is well to have a hand separator.

I find in talking with some of the men from this eastern part of the Province that very few of the winter creameries have been running, and that they are still manufacturing winter cheese. If this is continued we shall assuredly kill the cheese business. I have learnt, too, that where butter plants were put in they are making cheese instead of butter this season. This is folly. (Hear, hear). We cannot expect to have the high prices that we are getting for cheese much longer if we continue to manufacture cheese before May and after October. (Applause) Those men who are now making cheese in winter will be glad to have the butter plant running again in a few years. I say to you as strongly as I can : Do not discard your creamery plant and make cheese in winter. That is the time to make butter. If we are going to develop our dairy industry along the lines that will remain permanently profitable it must be by making cheese in the summer only and not in the winter, when butter should take its place. Winter cheese will hurt

the great output of summer cheese, and we shall lose in the end. By making all the butter possible we shall retain the fertility of our farms. Those who patronize creameries are on the right road to success, because the preservation of the fertility of the soil is one of the foundations of prosperous agriculture. (Applause).

The PRESIDENT: If we intend to build up a big butter business in Canada we must do as we did in the case of our cheese. Send the whole milk to the creamery, where a well qualified man will be able to handle it in the best way. If we continue the hand separator where whole milk establishments are in operation, we are certainly going to injure the butter business, for it is impossible to get that uniformity of make which is so essential in the butter trade. Everyone knows that from May to November we can, and we do, make the finest cheese in the world; but from November to May, owing to frozen milk, we cannot make the finest cheese, and for this reason we cannot afford to make cheese in the winter. (Applause.) We must make only the best cheese, and that only in summer. In winter we can make the finest butter, for we have all the facilities for doing so if we only avail ourselves of them.

FACTS WHICH BEAR UPON PROFITABLE DAIRYING.

BY WM. SAUNDERS, LL.D., DIRECTOR EXPERIMENTAL FARMS, OTTAWA.

In selecting a title for the talk I am to give you to-day I have allowed myself a wide field No business can be carried on profitably without proper appliances and equipment. Profit is what we all want, for profit means prosperity, and that is a pleasant condition coveted by all. One of the first conditions of success in dairying is that we should stock our barns with a good class of cattle, which will yield a large quantity of rich milk, and then raise on our farms such food as will be best adapted for dairy cows, and such as can be produced cheaply. It is better also to raise crops that will not draw too heavily on the fertility of the soil. The farmer's business is a many sided one, and for that reason he must be a well informed man, and he must also be an observant man.

Although the farmer is a manufacturer he occupies the somewhat anomalous position of not being able to put a price on his own goods. The markets do that. He should, therefore, economize in production so that the cost may be reduced He may then be successful should farm products fall to comparatively low prices. His farm forms the largest part of his capital and stock in trade, and it is from the soil of that farm that his living must be drawn. Soil is a complex substance. It consists mainly of finely ground particles of rock, reduced by the action of water and frost and air, mixed with decayed animal and vegetable matter. It has taken a great length of time—thousands of years—to make this soil. There are many kinds of soil, such as sandy, clayey, gravelly, loamy, and mixed soils, all having different properties. Where so much variety exists each field must be studied by itself before it can be cultivated to the best advantage. Sandy soil is composed largely of finely ground rock, in which sandstone predominates, and there is usually a considerable quantity of phosphoric acid, potash and lime in it. The vegetable and animal matter in a soil is the chief source of its nitrogen. Clay soils contain a good deal of silicate of potash and are usually rich in this important element, and are more retentive of water than some other soils. If you leave a sponge in water and lift it up it will drip to a certain extent, but after the dripping ceases you will see that it still retains a lot of water. That is what we mean by a soil "holding water." The power of a soil to hold water depends chiefly on its having a good deal of vegetable matter in it, or what is generally known as humus. Plants take all their food from the soil by means of water, and it is therefore important that there should be a regular and sufficient amount of moisture in the land. Too much water, with lack of drainage will make the soil stagnant, and plants grown in such soil will not give good returns. But where there is a good proportion of humus, and the land is well drained, such soil will hold a large quantity of water available for the use of the plants growing in it. Land should be well tilled and made loose in order that it may be in that favourable mechanical condition which will help the plant to make its best growth by enabling it to send its roots and tiny root fibres through the ground to collect the nourishment laid up for it. This they do by absorbing the moisture in the soil containing the nutriment which the plant requires.

Plants take up and assimilate a number of mineral substances in small quantities, phosphoric acid, potash and nitrogen being the three most important. Good arable land usually contains about 3,500 lbs. of nitrogen, from 4,000 to 6,000 lbs. of phosphoric acid and from 5,000 to 8,000 lbs. of potash in the upper ten or twelve inches of soil in each acre. There is usually also a sufficiency of lime and other minerals required. Were it practicable to make soil artificially and were we to undertake to supply the mineral constituents contained in an acre of good average land, valuing these at current market prices, it would cost a thousand dollars or more for each acre. Although soil contains so large a quantity of fertilizing material, it is very necessary, if its fertility is to be kept up, that the farmer should replace from time to time considerable portions of the plant food taken out of the land by the growing of crops. In this way only can the fertility of the soil be maintained. The farmer's soil has been compared to a savings bank If you put money into a bank, and then draw it out from time to time without adding any more to the deposit, it will soon become used up. And so it is with the land. A farmer may begin with a very good inheritance of fertility, but if he is careless in regard to replenishing the waste, if he is negligent of his manure, and allows it to leak away, thus losing valuable fertilizing material, he will soon find farming to be unprofitable. However, nature has provided that no matter how negligent a man may be he cannot entirely beggar himself. The plant food in the soil is so locked up that a good deal of it is unavailable, being made available gradually as the land is worked year by year. On the other hand the man who is thrifty, and keeps his land in good tilth, is aided by the sun, the air and the water, and is getting from the soil its best results while still returning a goodly portion of fertility. He is both getting and giving; but with a careless man it is just the opposite.

Lime is also an important element of soil wealth, especially for certain crops. I was very much struck when visiting last year some experiment stations in Great Britain in seeing frequent use made of lime there. I was told that many farmers use a few hundred weight of lime per acre every year with excellent results. The lime renders the fertilizers in the soil more soluble, and also acts favorably on the bacteria which convert the nitrogen in the soil into available form for plant use. The farmer's aim should be to use every means at his command to maintain and improve the fertility of his land.

The dairy farmer to get the best results must feed his stock with some liberality, and it is necessary that he buy more or less food in order to balance the rations for his cows. Bran is one of the foods which must be purchased, and this contains much plant food. The man who feeds a ton or two of bran to his cattle added to the other crops he grows, will find that if he has carefully returned all the manure to the soil that he has with this addition returned more plant food to his land than his crops have taken out. In this way the farmer may be able to increase the crop-producing power of his land. Cattle return in the manure a very large proportion of the elements the crops have taken from the soil, and the richer the food the richer the manure. Dairying is one of the most profitable branches of farming. Prof. Dean has called your attention to the great benefits the soil derives from the cheese and butter industry. In butter-making there is practically no waste of soil fertility, if everything is returned to the land that can be. But in cheese making about 20 per cent of the elements of fertility is taken away in the product—in the casein and other solids. Nevertheless the fact remains that the system of cheese making, compared with the growing and selling of grain, is greatly to the credit of the cheese industry, and exhausts the soil but very little. Under the old methods of farming the grain and hay, and in fact almost everything raised on the land, was shipped away, and nearly all the elements of crop fertility were thus parted with. You remember what a howl there was when the McKinley Tariff went into force, and our barley was practically prohibited from going into the States. That was one of the best things that ever happened us, because it led our farmers more generally into dairying, feeding more grain to their cattle, and putting back in the soil those fertilizing constituents formerly shipped to the United States in our coarse grains. The farmer who wants to get the best results from his dairy cattle, must feed them well If cows are fed succulent food in winter the flow of milk may be well maintained. Indian corn contains a large amount of nutritious material, and is therefore excellent food for cattle in winter when given with meal. There are two classes of corn grown for ensilage. One of these includes all the Dent varieties, the kernels of which look very much like a tooth. The other class of corn is

called Flint, and between these two classes we must choose the varieties we want for ensilage. We have found that the Dent sorts give the most vigorous growth, but they do not ripen so early or so regularly as the Flint varieties. It has been also found by chemists that the corn plant is at its best for cutting for ensilage when in the dough stage, as it then contains the largest amount of nutritive matter.

In this connection we have made some experiments at Ottawa, and have found that for the six years ending 1900 the Red Cob Ensilage Corn, a Dent variety, did best of all the sorts tried, yielding on the average 24.366 tons per acre. The Giant Prolific came very close to this, and the Thoroughbred White Flint was also within a small fraction of the record of the other two. The Selected Leaming was earlier than either of those other sorts to ripen, and although it gave about three quarters of a ton less than the average of the other three varieties named it is one of the best sorts for ensilage on account of its earliness in ripening. The Longfellow and Angel of Midnight are also good varieties, and early. The difference between the Red Cob and the Longfellow this year was not more than 10 per cent. so far as weight was concerned, and this is largely made up by the difference in quality. We have therefore come to the conclusion that the Flint varieties, on account of their earlier ripening, are likely to average best for silo purposes for the climate of Ottawa, as immature corn has a tendency to make sour ensilage. Do not, forget however, that corn ensilage is not a complete ration. It is necessary to have some cut hay or straw, and a little meal or grain with it, and perhaps a few sliced roots, if we would get the very best results.

Success in dairy farming depends very much upon the care that is taken of the barnyard manure. This is the subject which has been brought before Canadian farmers over and over again, and yet anyone who goes through the country and looks into the barnyards of the farmers will tell you that the sermon needs to be preached many times over. Experience has convinced us that to get the very best results from our barnyard manure it is necessary to take it to the fields in a green condition. During the winter it is generally practicable to draw the manure out fresh, and if it is put in little piles of about a third of a cart load each, there is very little loss from fermentation. If the fermentation takes place in the soil after it is spread and plowed under very little that is of value will be lost, but if it is fermented in heaps much of the nitrogen and potash will be wasted, and you will find that a ton of fresh manure will be equal to a ton of this rotted manure as usually made in the barnyard. And when you remember that a ton of manure loses while rotting 50 per cent. of its weight in three months, and about 60 per cent. in six months, you will see the economy of using the manure fresh. In our experiments with fresh and rotted manures we found that wheat, barley, oats, corn and roots have given as good crops from the use of the fresh as from the rotted where the same weight was used in each case. From our experiments at Ottawa it would appear that there has been a large annual loss going on all over this country for years by leaving the manure out in the barnyard to rot. Where manure is kept under cover it is well to have the young cattle or swine tread it down in order to keep it compact and prevent loss. Experiments conducted in Europe also go to show that leaving manure to rot in piles in the barnyard is a wasteful practice.

The actual value of manure depends largely upon the kind of animals which have supplied it. Cow manure is not likely to lose so much in rotting as horse manure, and where manure is likely to be exposed it is well to mix both together Barnyard manure contains about the following amounts of fertilizing substances per ton : 10 lbs. of nitrogen, 6 lbs. phosphoric acid, and 10 to 12 lbs. of potash. In addition to these, manure adds greatly to the amount of humus in the soil, and thus its use puts the land into a much better mechanical condition. Artificial manures are beneficial to a certain extent, but if a farmer depends too much upon them the results will not be so satisfactory, because there is no humus in these substances, and the humus in the soil will in time become more or less exhausted. The proper place for these artificial manures is as adjuncts or alternates. But where the farmer has a sufficient quantity of farmyard manure there is no need for any artificial manure.

Is has been found that clover, tares and vetches and in fact all the pod-producing plants of the class called legumes, have the power of extracting nitrogen from the air and storing it up in their roots and tissues. These plants were always known to be good in a rotation, but it is only of late years that the reason why became known. These

legumes have tiny knobs or nodules formed on their roots, and these nodules contain colonies of bacteria which have the power of taking nitrogen from the air and preparing it so that it can be stored up in the tissues of the plant. If such plants are plowed under the land is thereby greatly enriched. By sowing clover with spring sown grain we have found in August, after the grain has been cut, that the young clover plants cover the ground. They then make rapid growth and act as a catch crop, taking up the fertilizing constituents which come down with the rain, and making a mat growth of about 12 or 15 inches high before the season closes. If this is plowed under in October and a crop of grain sown on it the following spring, the effect upon that crop will be noticeably good. We have made experiments along this line, having plots of grain sown, with and without clover, and one can see the difference in growth easily. In a crop of oats we found a difference of about twelve bushels to the acre one year, and in another year a difference of ten bushels. Even after two years the good effects are not entirely lost. Similar results have been had with barley, corn, and potatoes by this process of plowing under clover.

If farmers will follow out the hints I have given, and in addition make a careful selection of seed, using only the best varieties, their work will be increasingly profitable. With good animals, fed on the best rations ; with the soil fertility retained and increased ; with more care in handling manure ; with careful selection of the best class and quality of seed, the prosperity which has been so apparent in the country of late years will be noticeably increased. Those of you who care to know more about our experiments along the lines to which I have been referring can get the reports and bulletins of the Experimental Farms free of charge by applying to the Department of Agriculture at Ottawa.

Mr. R. M. Ballantyne, President of the Western Dairymen's Association, was introduced to the audience, and thanked the Convention for the manner in which his name had been received. He said that the dairymen of Ontario, both in the east and the west, should work together to make the industry still more successful than in the past.

DAIRYMEN URGED TO FURTHER CO-OPERATION.

By H. S. Foster, President Bedford District Dairy Association, Knowlton, Que.

It affords me great pleasure to be here, and to observe the spirit of energy, earnestness and intelligence that has marked the proceedings thus far. I have been striving in the Eastern Townships of Quebec to interest dairymen along the lines which you in Ontario have been pursuing with such benefit to yourselves and credit to the country. I am very sorry to say that we have not been as successful, as a whole, as you have been in the advancement of the dairy industry. Of course we have accomplished something, but there is much yet to be done before we arrive at the stage that you further west of us have reached. Mr. Derbyshire has disputed the question with us as to whether we of the Eastern Townships or you of Ontario had the first cheese factory ; but judging by appearances it would look as if we in our section of the country had several of the oldest factories still in operation. (Laughter.) However, I am here to say that the time has come when, more than ever before, the dairymen of Canada should work together, so as to get the best management, the best furnishings, and the best disposal of our goods. Our general management of factories has greatly improved, but I think we could devise some method of working together in order that we might do better both as to quality and price in the matter of furnishing. The question of freight rates, also, certainly requires co-operation on our part. The railways and shipping companies will not care a continental what we do or say unless we are united. I believe the dairy industry is suffering from oppressive freight rates in a way that there is nothing on the continent to equal. They suffered in the same way in the United States, but they had a Commission enquire into the matter, and it has been put upon a fair and legitimate basis, and we will have to do something of the same kind in Canada, too. (Applause.) I have here the freight rates that were in operation a year ago, showing the amount paid per 100 lbs. from the various points named to Montreal, and you will see how unfairly some of the places are dealt with, and how badly the rates are in need of revision :

		Butter.	Cheese
Abercorn	75 miles	23 cts.	15 cts.
Acton	100 "	15	11
Bedford	56 "	21	14
Belair	159 "	18	15
Caughnawaga	9 "	9	8
Cookshire	128 "	21	18
Cowansville	57 "	21	14
Drummondville	117 "	21	14
St. Hyacinthe	69 "	13	10
Farnham	44 "	20	13
Sherbrooke	108 "	18	14
Lorette	165 "	18	15
Perth	140 "	18	12½
Toronto	338 "	23	23
Windsor	566 "	35	35
Alfred	70 "	14	12
Apple Hill	63 "	10	10
North Nation Mills	140 "	14	10
Smith's Falls	129 "	16	12½
Brigham	53 "	21	14
Brockville	155 "	16	12½

It needs the united action of the dairymen of the Dominion to bring this matter to a focus, and I am of opinion that with united action we could do something to improve the condition of affairs shown in the table of rates I have just given. It seems to me, also, that in the improvement of factory furnishings organization is essential. What do you think of it, Prof. Dean?

Prof. DEAN: I think so.

Mr Foster: Uniformity is one of the greatest secrets of the success of dairying in Denmark. I know that you in Ontario have also accomplished a good deal in the way of improved methods in dairying, and that you have been an object lesson to us, but if you could go a step or two further, in organizing to purchase a better class of furnishings, of a more uniform sort, getting your milk hauled by contract, and enlarging the capacity of your factories, there would be much more uniformity in the quality and appearance of your cheese that increased success would be certain.

The question of the lactation period of our cows is also an important one, and deserves the closest study. We have about six months when we must keep our dairy stock in doors. Our barns and cow stables should be of the best sort, in order that cattle may be housed in a proper manner. My barn is 140x120. It was cemented a year ago, and I am glad I did so. I am going to enlarge it by about 100 feet, and will have that cemented also. I have what are called the Cherry litter carriers, and by their use a fourteen year old lad can keep a stable as clean as possible, with fifty-four head of cattle in it. All you have to do is to load it, pull a cord, and it will run along to the pile and dump itself.

Light and ventilation are also most importants things. In a copy of *Hoard's Dairyman* I noticed this question of ventilation treated, and studied the matter along the lines suggested. This summer I had another farm come into my hands, and had to rig up the stable, and I followed the hints in that article I had read, and it is wonderful to find the sweet and wholesome air that is now in that stable. My other barn is now filled with hay, but when the hay is used I am going to improve it in the same fashion. In winter dairying the essentials are warmth and comfort, succulent food, good ventilation, cleanliness and plenty of light. I feel assured that we can make a success of winter dairying in this country The time has arrived when we must consider all these things, and put forth a united effort to improve. We can produce corn ensilage in perfect condition, and with that succulent food available in plenty there is nothing to hinder winter dairying being successful with us, if we only go into it intelligently and energetically. Too many are now wintering stock and getting little or nothing from them, whereas if we had winter creameries, hauled our milk by contract, fed ensilage, improved our stabling, and studied the best modern methods, we could make a great success of dairying. Let us work

together in harmony more and more, and aim at uniformity of the highest grade. Nothing will pay us like combined effort in pushing on this great dairy business.

FROM THE EXPORTER'S POINT OF VIEW.

By Arthur Hodgson, President Montreal Butter and Cheese Association.

I have been listening with much pleasure to the speeches which have been made here, and have wondered why, in the running of the Convention, we poor Montreal merchants had been left out. I have heard it said that some consider us a rather bad lot. (Laughter). But whether we are a bad lot or not you cannot get on without us. (Applause.) We are your helpers. Occasionally when the English dealer will not pay you the price we think you should get, we have bought above his rate, and have held it over, sometimes at a loss. I think it would be a good thing to make some arrangement whereby the exporters could be brought more closely into touch with factorymen. It is a good thing to come together to study how to handle milk in the best way, and to find out how to make the finest butter and cheese; but is it not a good thing also to get the exporter's experience and to be told by him just the kind of cheese and butter that the English market requires? There are incidents in the life of the exporter which affect the cheesmaker. I have always looked upon the cheese and butter exporters and the manufacturers as one family. I have always held that what affects the merchant in Montreal who handles the finished product will also affect the men who produce the butter and cheese, and *vice versa*. If the merchant has had a bad year you may depend upon it that he will be more conservative the next year, and that will tell upon the producers. We are really one family. Mr Foster has asked the Montreal merchants dealing in dairy produce to meet his Board, and I think we will have a profitable conference.

I was glad to hear Prof. Dean speak against making cheese in the winter time. There is no doubt whatever that those who are manufacturing cheese after the month of October are making a fatal mistake. (Hear, hear.) I cannot emphasize this too much. You may get a few extra dollars in the month of November, but you will lose probably fifty to one hundred fold next season. We all felt when we came to October that there was no more cheese on hand than could be consumed. The previous year that was the case, and the British people consumed all the cheese, and when the new cheese came on the market they were starving for it. Had that been so this fall it would have been well for us. But we found that about 80,000 boxes have been made since October. A great mistake has been made in manufacturing this cheese. I am satisfied that every exporter and man of experience will bear me out in saying, "Do not make cheese in winter, but turn to butter making in that season." You cannot make cheese in November as well as you can in September. It is not to be expected that good cheese can be made from frozen milk—it cannot be done. This winter cheese will not keep well, and Englismen cannot be deceived as to quality. You run the grave risk of finding out next year that you cannot get as much for your cheese as you would if this winter cheese had not been placed on the market.

I have been asked by the merchants of Montreal to call a meeting to discuss the subject of advising the Government to issue a circular advising factorymen not to make cheese in April. It does not require much argument to prove that November cheese has added to the accumulation of cheese on the market, and will affect the price; and that April cheese will do the same. We cannot call back our November cheese, but we can surely abstain from making the situation worse by turning out April cheese. If we are later in making next year we may possibly remedy the condition we now deplore. When we consider the millions of dollars that are annually circulated by the merchants of Montreal, I think that if the men who ship us your goods could be brought into contact with the principals of the firms it would prevent much misunderstanding. In such an event I think that some of the sins charged against us might be placed on other shoulders. I congratulate this Association upon its august opening to-day. It has been an honor to have the representative of Her Majesty the Queen here to encourage us with his presence and co operation. I trust that each and all will follow out the good suggestion given by the practical men in every branch of this great dairy industry.

The PRESIDENT: I am delighted with the remarks of the previous speakers on the matter of not making winter-cheese. The words of wisdom they have spoken should be carefully heeded. Winter milk cannot be made into the finest quality of cheese; remember that. Every time a dollar's worth of this frozen stuff is shipped to the old country our reputation is injured, and it is commercial suicide for us to go on making this November cheese. (Applause.)

THE EVOLUTION OF THE CANADIAN DAIRYMAN.

By PROF. H. H. DEAN, O. A. C., GUELPH, ONT.

By the term evolution we mean a change from the lower to the higher. We can have the evolution of the dairymen of Canada only by lifting those on a lower plane up higher; and the whole problem of successful dairying is wrapped up in this change.

In the history of a great many dairymen there are three changes: evolution, revolution and devolution. The first two are all right, but we must avoid the last of the three. How do we bring about evolution, or change, and improve in any line of work? It is a process of education, and men get educated chiefly by experience. There is an old saying that "Experience is a good teacher, but the school fees are very high." Men also get educated by observation. They observe how their neighbors do things, and also what is done in dairy schools, and in experiment stations, or wherever advanced work is being tried. Those who observe progressive methods, and attempt to carry out these methods, will be educated and progressive. Men also get educated by reading and one of the advantages of these Dairy Conventions is that we have so many men who are willing to assist in spreading this information all over Canada. The voices of the speakers reach only a limited number in this hall, but their words are repeated to thousands through the newspapers so largely represented here, and through the official report of the proceedings published by the Government. Now, I use the word dairymen in its widest sense, taking in the farmer providing the milk, the butter and cheese maker, and the cheese and butter buyers—that is, if it is possible to take them in. (Laughter.) The dairy farmer is the most difficult of all to influence, so as to lift him from the lower to a higher plane. Many of you think it is easy for them to make such a change. Some of you are always nagging at the dairy farmer, and you think he has an easy time of it. But he has many difficulties to contend with, many complex situations, and very many trials which the cheese and butter maker does not have.

Eastern dairymen have not so many difficulties in summer as those of Western Ontario. At the College, except in June, we have had to feed the cows in almost the same way as in winter. We had to give them meal and silage because the pastures were not as good as you had them here in the east. Now, while feeding is an old question, and one that must be closely considered, there are other subjects that come before us, and the wise dairymen must consider these if he would keep abreast of the times, and reach that higher plane upon which he should stand. Our experience has been that corn silage has been the best and cheapest and most stimulating food, along with bran, that we have. We have fed our dairy cows 30 and 40 lbs. of silage, and 4 to 6 lbs. of bran, and have kept up the milk flow pretty well, and with no trouble about the flavor of the milk either for cheese or butter making. And I think the time is coming when every dairy farmer will provide a silo for summer use as well as for winter accommodation. In fact, I think that with us the summer silo has been even more profitable than the winter silo. I know that it has helped to keep up the flow of milk in our dairy herd, which has averaged 7,000 lbs. of milk per milk per cow during the past year. Now, these are not all pure-bred cows. A number of them are ordinary grade cows, but they give from 8 000 to 9,000, and some of them close to 10,000 lbs. of milk by the aid of the summer silo. I think our record is possible for any dairy farmer who will go along right lines. He must select a better cow, feed her better, keep her better, and he will get better results.

We have been experimenting with foods this year. There was an immense apple crop, which left a lot of surplus fruit to experiment with. We found that as soon as the cows were fed largely on apples they began to fall off in the yield of milk. When we fed

half a bushel of apples to the cows, instead of increasing the flow it was decreased. We also fed apple pomace, which we obtained from the cider mill, which seemed to have a more stimulating effect on the flow of milk than the whole apples, but in both cases the milk had a very objectionable flavor. We also experimented with rape and turnip tops, and we used a substance called "Virginia Cattle Food," that, it was said, would purify milk. It was claimed that with this substance you might feed any ration you liked and that there would be no taint left in the milk. When we fed this material with the turnips and rape there was a considerable improvement in the flavor of the milk and butter compared with what would have been had none of this Virginia Cattle Food been given; but in the case of apples and pomace no improvement was noticed. I understand that the firm that is introducing this new food is going to push it in Canada. I would say to you that while there is an improvement through its use in the case of two of these foods with objectionable flavor there was no improvement in the case of the third. It is safest and best to feed only such foods that have no bad flavor, and thus the use of any of these special "foods" will be avoided I merely give you our experience. It would not be our practice to feed apples, rape or turnips to milking cows.

Let us look, now, at some points in which the butter-maker must improve, if he is going to rise from the lower to the higher level. The butter maker who does not think, does not read, does not experiment, is going to decline, and remain on the lower plane. This year we heated milk from 140 to 200 degrees, and we found that there was less waste of fat in the skim-milk and butter-milk. The keeping quality of the butter was also materially improved by the heating of the milk to the higher temperature. We had three boxes of butter made from milk separated at 90, 140, and 185 degrees respectively. These boxes were made in May and were kept stored in a place where the temperature was about 55 or 60 degrees. About the middle of August the three boxes were taken out and tested, when it was found that the butter made from milk heated at 185 degrees was of a fine table quality, while the other two boxes of butter made from milk separated at lower temperatures were distinctly off flavor, more particularly that made by separating at the ordinary temperature. If we are going to develop our trade in export butter for the British market, which requires the finest flavor and good keeping qualities, we must practice pasteurization. But we must remember that while heating milk is the best thing to do where the cream separator is used, it is not advisable in the case of setting milk in cans or pans. In order to get cream by gravitation, or rising, the milk must be kept cool. So you will see that the conditions of temperature for the separator and the can or pan are directly opposite—heat the milk for the separator, but cool it for setting.

We also made experiments as to the effect of handling butter with moisture. In the British market they count butter with over 16 per cent. moisture as adulterated. In our work we found that the more salt used the less moisture there was in the butter. Butter salted very slightly appeared to be dry. Salt has the effect of expelling moisture, as you may have noticed in a cheese factory that when the salt is added the whey starts to come out. However, butter may not have an excess of moisture merely because the moisture appears on the outside. The more you work butter the less moisture there will be in it. I found that to be the fact also in Denmark. There is little difference in the use of wet or dry salt in butter-making; in our experience we found practically no difference in this respect. We found, too, that it did not matter whether the butter was churned into small granules or large ones, where the butter was intended for immediate use. We had success with both the small granules and the more lumpy condition. There is a good deal of nonsense talked about the necessity of having butter in this fine granular form. We found, however, that the butter churned into large granules had not such good keeping qualities, because there was more butter-milk incorporated with it. But, as I have already said, if the butter is to go on the market soon it does not matter whether the butter has come in large or small grains when using a combined churn and worker.

I have heard a good deal about the "over run" in butter The over run is the excess of weight in the butter over the amonnt of butter-fat in the milk. Some have talked about an over run of 25 and even up to 35 per cent, and yet have good, merchantable butter In our experience the over-run has been from 10 to 15 per cent., and there must be something decidedly wrong with the man or his methods who would make butter with an over-run of 30 to 35 per cent. In fact, it cannot be done with fair weight and an honest test.

I must now turn to the cheese-maker. I believe we have improved very much in the quality of our cheese, although there is perhaps too much poor cheese still made. One of the things that has done a great deal to improve our cheese of late is the discussion of the question of different temperatures in the curing of cheese. We have been experimenting in the curing of cheese for the last three years, and have found that by curing at a temperature of 65 degrees we have saved about a pound on every hundred pounds in the case of those small 30 to 40 pound cheese, and about half a pound in the hundred weight in the case of the cheese weighing from 70 to 80 pounds. This means an improvement in quality, as well as an increase in weight. If our cheese makers will pay more attention to this matter of temperature in curing they will find that the business will be raised to a higher level by a system of evolution and revolution in present methods.

We found also that washing curds at a temperature of from 90 to 110 degrees has given us the following results: It has improved the flavor of cheese made from bad flavored curds, but it has not improved the flavor of good curd. It also caused a loss of about a pound of cheese to every 1000 pounds of milk used in making. When you wash a curd you take some of the cheese making material out of it. Washing at a higher temperature gives a slightly better flavored cheese, but it means a greater loss in weight. The results proved that washing at about 90 to 100 degrees is best as a rule.

I am about to touch upon a point on which we shall possibly disagree. Some of us get ideas into our heads, and it is possible for us to so cling to them that it is difficult to have to come to disbelieve them. I admire a man who will admit that he is wrong when he finds that it is so. Now, this matter of aeration is one that has been discussed many times at our conventions. We have been experimenting with the aeration of milk at the College, and this is the third year of our work in this special line. While I no not want to discourage the aeration of milk, I must say that we have found no benefit from it so far as the quality or quantity of cheese made from such milk is concerned. I will go further, and say that the aeration of milk as commonly practiced in the barnyards of this country does more harm than good. I do not say that under every condition aeration is of no benefit. But I believe that if we get healthy cows, feed them with good food, and milk them under proper conditions aeration of milk will be time and money wasted except for the cooling produced.

We have also studied the question of keeping milk in pails as against keeping it in cans. We have what are called shot-gun cans, holding about thirty pounds of milk. We get from 250 to 300 pounds of milk in the evening. We put about half of it into small cans and the other half into large cans, in order to see what difference there would be in the quality of the milk. We found the milk sweetest where kept in small cans without cooling by the use of water. The only advantage in keeping the milk in pails is that it cools more rapidly, and is consequently better for the factories. But if the milk is cooled first of all there is no advantage in the pails. Now I hold that an experiment is no experiment at all unless you make every condition alike as far as possible, except the special point that you have under investigation We have taken the milk from our cows at night. One half of that milk has been cooled to a temperature of 62 degrees. Into that we put from one ounce to one pound of "starter"—or as I prefer to call it, "culture." We have found that milk so treated was over-ripe next morning. But milk that was cooled to that temperature with culture added the evening previous was practically free from gas. We also took samples of milk and cooled it to 42 or 46 degrees, and found that after adding the culture in the evening such milk was in good condition next morning. I believe that this question of gas is not fully understood, and that the cause is largely from bad handling, and especially from keeping milk at too high a temperature. We must find out the right way, and I think that our experiments point to that right way. If the patrons will cool the milk to a temperature of 60 degrees, and if the cheesemaker thoroughly understands the preparation of cultures or starters, and making generally, he can control this question of "gas." Now, I am not prepared to state the exact temperature, or the exact amount of culture required, but I believe that before we get much further into this century we will know how to control gas in curd just as we know how to control the ripening of the cream. The cheesemaker then will be able to control his milk as the buttermaker now can control his cream.

The College and Dairy School is helping to bring these things about. Too many of you in the eastern part of Ontario think that because the College is in the western part

of the Province that therefore you have nothing to do with it. But I can assure you that is not so. Some of our best students have come from Eastern Ontario. The farmers of Eastern Ontario who will visit us will get as hearty reception as those from any other part of the country. In our first and second years' course we aim to give our students a thoroughly practical knowledge of dairying. We bring them into our dairy and give them a practical acquaintance with the care of milk, dairy utensils, the Babcock test, etc. To our second year men we give a course of lectures on co-operative dairying, and give them practical experience in creamery work and in cheese-making. This means that these men, who will be patrons in the time to come, will have a practical knowledge of dairying, and will stand upon a higher plane in their work of co-operation. Here in Kingston, in the heart of Eastern Ontario, you have an excellent Dairy School manned by first-class men. At Guelph we are able now to give a practical course in the dairy bacteriological laboratory. Our Professor of Bacteriology has recently spent nearly two years in Europe, and he has been giving lectures and illustrations to our students. They study bacteria in every way. They also study disinfectants, and we are making distinct advance along every line. They analyze milk, butter, and cheese; they make alkaline solutions, and in every way try to make the most of their opportunity to become thoroughly educated dairymen. But I am free to say that there is no way to learn the cheese and butter making business like going into the cheese factory and the creamery. I would rather set ten men to work than be able to do the work of ten men. If we can get men to think more than they now do, I believe we shall bring about such a change in the dairy business in Canada as we have not yet seen in the past. There are more marvellous changes awaiting us in the next twenty-five years than we have yet dreamed of. (Applause.)

AGRICULTURE—PAST AND PRESENT.

By C. C. James, Deputy Minister of Agriculture.

We have seen in almost all our newspapers articles dealing with progress made during the past century. We have read of the development of literature, the increase and spread of population, the expansion of our educational system, the addition to our churches, the improvement in our transportation facilities, and the growth of our trade and commerce.

But how about the development in agriculture? We look almost in vain for any reference whatever to this subject. Here and there you do see some mention of what has been accomplished in this direction. But what you see is as an oasis in the desert. And yet it is on the great producing class engaged in agricultural development that our town and cities, with their churches, colleges, and all the developments of our modern civilization, depend.

Now what has been accomplished in agricultural development? One hundred years ago—75 years ago—the ancestors of the people of to-day were engaged in hewing homes out of the unbroken wilderness. Their income—not in cash, but mainly in barter—was was derived from four sources: timber, ashes, some grain, and furs.

Twenty-five years later there was a step upwards. Then immigration from the old land began flowing in. Not only did people begin coming from the mother land, but these people brought with them a few cows, some horses and sheep; and, what was more important still, a love for live stock.

At the end of another quarter of a century another step was recorded in agricultural evolution—in the movement from a lower to a higher level. The co-operative principle was applied to the manufacture of cheese, and shortly afterwards to butter, as well—and I know of nothing which has done more towards the development of the wealth of this country than this co-operative cheese and butter industry; but fruit-growing, which has of late developed into an important industry, has done a good deal in the same direction.

We are now at the beginning of another century. What of the future? Along what lines will the development of the years to come be found?

One of the principal lines, in my opinion, will be butter. I say butter, rather than cheese, because it seems to me that in cheese we have about reached the limit. In butter, on the other hand, the future is all before us—there is room for unlimited development.

Other important items in the production of the future will be bacon and poultry—industries closely connected with dairying—pure-bred stock and fruit.

How is development along these lines to be assisted? Two powers should be called in to promote the work of development. One power is the Government, or the people as a whole, and the other is found in the people acting as individuals, each man doing the best he can, individually, for the general good. In some cases there seems to be a disposition to look to the Government to do too much; in others the Government perhaps hardly does enough. The Government should do as much as possible in spreading information by assisting conventions such as this, by grants for work in instruction, and by the publication of bulletins and reports.

But the individual also has duties to perform, and one of the most important of these is to put himself in line to secure full advantage of all the information provided. The man engaged in dairying who does not attend conventions such as this, who does not join a dairy association, or the general farmer who does not put himself in a position to secure the publications issued by the Government, is not performing the duty he owes to himself and his fellows.

But more than this is needed. Besides attending conventions, besides reading official publications, practical individual effort is needed, as well. While the Government can assist on the lines I have indicated—while it can do something in the matter of transportation—the man who depends too much on anything outside of himself is likely to fail. Our first duty is to do all we can for ourselves—to make the best use possible of our individual talents and capacities—and to supplement this by whatever can be done by the whole people acting together through the Government. If this is done, success will mark the new century even greater than the success which has been recorded in the past century.

I have noticed that the towns which are making the most substantial progress are those in which the most intelligent interest is being taken in the progress of farming in the surrounding country. In sections where the line is most closely drawn between the town and surrounding country, conditions are most unfavorable. I have seen towns that are ready to bonus any little industry that promises to give employment to a few men, but where very little attention is paid to the possibilities of increasing the value of the trade of the surrounding country. They will grant a bonus to a factory, that may be stolen away by another town in a few years, but never think of investigating means that may be adopted for increasing the value of the farm trade just beyond their own borders—a trade that is always there.

But that is just where development can be promoted. One, two, or three creameries on the borders of a town enormously increase the value of the trade coming into that town. It means putting monthly checks for ten, twenty, forty, fifty, or one hundred dollars into the hands of progressive farmers all about, and with the increase of wealth among those farmers there is a natural increase in the trade flowing into the town. I have often thought there are many towns which could do much more to increase their own prosperity by assisting in developing agricultural prosperity in their neighborhood than by bonusing manufacturing enterprises, that are apt to prove, so far as the towns particularly interested are concerned, of a somewhat ephemeral nature.

Many think of agriculture simply as a synonym for hard work. Ask a cartoonist in a city to picture a typical farmer, and he gives you a form bent with toil. We have seen so much of this, and have heard so much of the alleged dull and dreary monotony of farm life that many farmers have come to consider themselves as little better than white slaves. This is an idea that people in the towns and people in the country should seek to get rid of as soon as possible. Is farm life one of hard labor? Show me the man who is making a success anywhere whose life is not laborious. The men who are working the hardest to-day are not found on the farm. The closer you get to men engaged in the great financial undertakings of the country the longer you find the hours of toil, and the harder you find that toil. The hours of these men are not limited to ten—they are limited only by capacity. Sometimes this limit is stretched until mind and body go down together.

Is farmwork dull and uninteresting? If you want to find where work is dull and uninteresting go into our factories, where men toil nine or ten hours a day, day after day, at the same kind of work.

The whole character of life on the farm has changed. An address such as Prof. Dean has given on the evolution of the dairyman could not have been given ten years ago. The people would not have then understood the terms made use of; the facts to which these terms apply were not understood.

But we are merely at the beginning of it. There is opening before us a limitless field for a search of entrancing interest—a field which in France and Germany is engaging the attention of the greatest intellects.

Who was the greatest man France has produced in the last 200 years? It was not Napoleon, but Pasteur, the man who almost literally spent his life in the study, with the aid of a microscope, of the minutest organisms—the man who saved the flocks and herds of France from decimation and the vineyards from destruction—the man who curbed the power for evil of some of the most dreadful of diseases.

Mr. James then made reference to a number of interesting facts in connection with the development of our fruits with the purpose of showing how interesting the study of agriculture in some of its phases may become.

There is still room for research—still room for discovery. And see the importance of the interests dealt with Our mineral, our forest, and our fishery resources are all important. But, add these all together and multiply them by twenty-fold, and then, and then only, do they begin to compare in importance with the industry of agriculture. Not only this, the possibilities of increase in profits are greater in agriculture than in any other lines. In manufacturing there is not much room for adding to the possible profits in any given line; in agriculture there is unlimited room.

Take one illustration. Prof. Dean has told you that the College herd of milkers averaged 7,000 pounds of milk per cow last year, and that the average return for all the herds of the Province is 4,000 pounds. That means a loss of 3,000 pounds per cow; and, as there are nearly a million cows in Ontario, that figures up a loss of $15,000,000 per year.

That is not the only loss—that is not the only line in which it is possible to increase production and profit. Take the loss owing to lack of drainage, and in all other lines where the best use has not been made of our opportunities and resources, and the aggregate, if it could be figured out, would stagger our imagination.

If I had the moulding of the youth of our country, there are three things I should try to impress upon their minds—the necessity of becoming thoroughly familiar with the history of Canada, and particularly of this Province; a comprehension of our geographical extent and resources; and at the earliest moment, a true sympathy with, and full appreciation of, the wonders of nature.

EXPERIMENTAL AGRICULTURE UNDER THE DOMINION GOVERNMENT.

Dr. Wm. Saunders, Director of Experimental Stations, Ottawa, then gave an interesting address in which he described the development of Experimental Farms in agriculture in Canada, and detailed the class of work done at the various stations extending from Nova Scotia to British Columbia.

CREAMERY BUTTER-MAKING.

By J. W. Hart, Superintendent of Dairy School, Kingston.

It has been a great source of satisfaction to our dairymen that prices of dairy produce have ruled so high for the season now about closed. At the same time it is a matter for regret that the butter exports have fallen off so materially. As stated by President Derbyshire in his opening address, the exports of butter will be two million dollars less than in 1899. At the same time the importance of our butter industry is not measured by the exports to the same extent as the cheese manufacturing business is. With the majority of our people, butter is a necessary adjunct to the daily diet, while cheese is partaken of more as a luxury and is not found on the regular bill of fare.

There can be no doubt but that the quality of our butter is steadily improving, and with this improvement in quality we naturally expect a greater consumptive demand. Again, with the greater industrial prosperity prevailing during the past season, the per capita consumption of butter has been largely increased. The high relative price of cheese has tempted the combination butter and cheese factories to manufacture cheese instead of butter. If the farmers fully appreciated the high feeding value of the skim-milk as compared with whey, they would usually find it to their advantage to have butter rather than cheese made during the fall, winter, and early spring months. Especially is this true where the calves are being raised. By means of separator skimmilk the calves can be fed much more economically and quite as satisfactorly as if they were to take the milk in nature's own way.

It has been said that there are two classes of farmers ; those who consume at home what they could not sell, and those who sell what they could not dispose of at home. We sell our cheese because we do not care to eat it, while we eat nearly all of our butter because we esteem it as an article of food and do not care to sell it. As an indication of present home requirements, it is stated that in Montreal about 550 packages of butter averaging 60 lbs. each are consumed daily. In Toronto probably as much more is eaten, and it is this growing local demand for creamery butter that is largely responsible for the falling off in exports. While milk and the products manufactured from it are better appreciated than formerly, there is still room for a great deal more of our milk supply to be economically consumed in our homes Prof. Atwater, the eminent American authority on nutrition, states that a quart of milk contains as much nutriment as a pound of the best beef steak. There are yet too many homes where milk is regarded as a luxury instead of being appreciated as one of the best and cheapest tissue building foods that can be obtained.

The patrons of our winter creameries sometimes state that it costs too much to produce milk in winter, and I know a number of farmers allow their cows to go dry rather than milk them during the winter months on account of the expense. Others again, who are making a study of the business, find many ways of reducing the cost of production, and report that they find the production of winter milk profitable. How can we reconcile these conflicting statements, and how can we induce those farmers who are not producing milk economically, and those whose cows are standing in the stable idle and a source of expense to their owners, so to breed, feed and handle their cows so as to produce cheap milk? There is no doubt that corn silage forms the basis of the cheapest winter food, and milk is produced more economically where it is part of the ration. I say a part, for no intelligent dairyman will feed corn silage without bran, pea meal, clover hay or some available feeding stuff rich in protein. Corn silage supplies the heat and force producing part of the ration, while the tissue building material needed for the sustenance of the cow's body and for the growth of the calf, for which the milk as furnished, is deficient. A great deal of the prejudice against silage is on account of this fact not being appreciated ; the silage being fed without any knowledge of its composition and uses in the animal body, and the proper feeds not being given along with it to form a balanced ration. Corn silage is one of the most satisfactory foods to tide over the annually recurring summer drouth. In feeding it during the summer, one must bear in mind that it will not keep so well ; hence the summer silo should be smaller, so that a comparatively small feeding surface is exposed. It is true that some of the owners of milk condensing factories object to the use of silage, but the cause of their opposition to silage feeding is on account of the stables being badly ventilated and the milk left sitting in the stable after it has been milked. Where silage is properly fed we get a much finer quality of butter in winter at less cost as compared with dry feed.

The inevitable effect of the high prices of cheese prevailing during the past season is to cause a large stream of milk to be turned in that direction. This in its turn will bring about a scarcity of butter, so that we are likely to have a re-action in favor of butter-making. Already there are signs that there will be a great scarcity of good butter before the grass springs again.

The tendency to build small and poorly-equipped creameries should be discouraged. These cannot be operated with profit to anyone, and are a constant source of loss to all interested. In fact the decline in winter butter-making can be largely traced to these small concerns where the output is not large enough to enable them to hire a thoroughly skilled

butter-maker. Where one large and modern creamery in charge of a good butter-maker, and properly equipped with a butter-making outfit, having its outlying skimming stations and in which could be made the finest grades of butter at the lowest possible cost, would be a profitable investment, we often find a number of small and inferior plants grafted on to as many small cheese factories. Hundreds of such plants scattered all over the country, the most of them closed for lack of patronage, attest the folly of attempting to carry on the business of creamery butter-making in small and poorly-equipped creameries. Rather than adopt this style of creamery butter-making, let us go back to the private dairy where at least everything was under the control of one responsible person. We have, however, a number of successful creameries, and I am glad to say that the number is increasing, where skilled butter-makers are employed, and where the butter produced is of the very best quality.

In building a creamery we should have sufficient faith in the permanency of the business to erect a neat and substantial building. The building should not be set up on piers or cedar blocks, but put on a solid stone foundation. The floor should be of cement. A good cement floor is practically indestructible and will prove the cheapest in the end. In the butter-making department of the Kingston Diary School the wooden floor had been laid about 6 years. Under the separators it had rotted so badly that it was necessary to replace portions of it in four years. It was no ordinary wooden floor. The joists three inches by eight inches were laid 12 inches apart and the best quality of $1\frac{3}{4}$ inch pine flooring, tongued and grooved, was used. To preserve it and add to its appearance it was always kept well oiled, but when it was taken up it was found that some of the joists had rotted completely away. Last summer it was entirely removed. In laying our cement floor it was necessary to fill in about 3 feet; large stones were used and these were well hammered down. These stones were laid to within six inches of the old floor line; next a layer of concrete was spread to the depth of $4\frac{1}{2}$ inches. This concrete was composed of one part best Portland cement, three parts sand and five parts rock broken to pass through a two-inch ring. Before this had thoroughly dried the surface course was laid. This surface course was $1\frac{1}{2}$ inches in thickness and consisted of one part best Portland cement and two parts crushed granite mixed dry and afterwards mixed with water. This left the surface of the finished floor one inch below the level of the old floor line, which allowed the edges of the floor being raised to the old floor level to throw the water away from the walls. The floor slopes to ample gutters, and these gutters are graded to trapped drains. The contract price of the floor was $2 per square yard, and so far it has given complete satisfaction. In laying a new floor the walls for some distance above the floor should be of stone or brick, so that in the daily scrubbing the walls would not be constantly wet and thereby decay in a short time. If stone was plentiful I should like to have the stone foundation walls continued up as high as the window sills. In many factories there is more water on the floor than is necessary; some slop is unavoidable and the building will be damp unless it is properly ventilated. The ceiling should be quite high and the ventilator should run from the making rooms up through the highest part of the roof. These ventilators can be provided with slides operated from the floor, so that the air inside can be kept comparatively dry at all times. In some cases where a creamery plant has been installed in a cheese factory, the partition between the boiler room and the factory proper has been taken away in order to utilize the heat from the boiler in warming the room. The dust, ashes, smoke and smell of grease from the engine room will not improve the quality of the butter, and some other means of heating the building, preferably steam pipes or radiators, should be used. All the machinery should be the best of its kind and should be arranged with special regard to saving labor. With economy of production we want economy in manufacturing, so that the largest possible net returns will go to the man who handles the cow.

At the Kingston Dairy School our custom is to pasteurize the whole milk. In some cases we have brought the milk up to boiling point, and have failed to discover any injury to the cream or butter owing to the high temperature. Up to within a short time ago our practice was to cool the cream as soon as separated down to 50 degrees or lower. I do not find however, that there is any advantage in cooling it so low, and am satisfied if it is brought to 70 degrees and the starter at once added, we not only save ourselves the trouble of and fuel required for heating the cream to ripening temperature, but get the process of ripening completed earlier in the day, and do not have to attend to the cream

at night. Our practice is to take rather rich cream from the separator, say about 40 per cent. fat, and to use quite a heavy starter. By this means we get the cream ripened in 6 or 8 hours, and can allow considerable time to elapse before churning it the next morning. By having the cream held a long time at a low temperature we get that firm waxy butter so highly esteemed by the trade. A great advantage in pasteurizing the milk is that we are enabled to return the skimmilk sweet to the patrons. We also get more exhaustive results in separating and churning. At the same time I cannot say that there is an increase in the butter over handling raw cream, probably owing to the fact that the butter made from pasteurized cream contains less moisture. Between Nov. 19th and 30th in the Dairy School, we received 26,956 lbs. of milk which contained 1,226.63 lbs. of fat, from which was churned 1,384 lbs. of butter, being 112 lbs. of butter to 100 lbs. of fat in the milk. This I think rather a good average, as all the butter was made into pound prints.

In Scandinavian countries pasteurizing is almost universally practiced, and we know that their butter brings the very highest prices in the British market. In Denmark their custom is to heat the milk to about 90 degrees for separating, following which the skimmilk and cream are separately pasteurized. To prevent the spread of tuberculosis the law compels the pasteurization of the skim milk. In Norway and Sweden the practice is to pasteurize the whole milk as we do the most of the time at the Dairy School. We cannot expect that our creamery butter will supplant the Danish, so long as we continue to export butter made from raw cream during the winter months. In the local markets, too, we find the pasteurized creamery butter very much sought after.

From a national standpoint there is another phase of the export business to which we shall be compelled by the diminishing fertility of our farms to pay more attention To maintain soil fertility we must return as large a proportion of the fertilizing constituents of the crops as possible to the land. In making and selling butter we may practically retain on the farm all of the fertilizing constituents utilized during the process, while in selling cheese we are removing some of those valuable materials, less rapidly, it is true, than in selling grain, but still amounting in value to about $20 for each ton of cheese made; or in other words 10 cents for each 100 lbs. of milk manufactured into cheese. In contrasting the returns from butter and cheese, this great drain upon soil fertility is scarcely ever taken into consideration, while the increased feeding value of skimmilk over whey is also rarely taken into account. The farmer of the future will pay more attention to the value of these by-products, and will not measure his returns entirely by the size of the cheque he gets from the factory or creamery.

Mr. EVERTTS: In his address yesterday Prof. Dean made reference to what is called Virginia Cattle Food, the proprietors of which claim that by its use the bad flavors arising from the feeding of turnips and rape can be done away with. I would like to know if it leaves a clean flavored butter or cheese. Does it thoroughly rid the milk of these bad flavors? I would not like the farmers to go away with the impression that they may feed rape and turnips, and by using something else they can make clean flavored cheese or butter from such milk. I would like to have this matter settled definitely here.

The PRESIDENT: There is no one here who knows better than Mr. Everttts that it cannot be done at all. (Applause and laughter.)

Mr. JOHN ECHLIN: I would like to ask Prof. Dean if his patrons at the College dairy preferred cold or warm skimmilk. Our patrons rather appreciate our pasteurized skimmilk at high temperature. It is not cooled down very much by the time it gets home.

Prof. DEAN: We send the skimmilk home hot in the winter. In the summer time we cool it down to 60 degrees, so as to keep it sweet while going back to the farms.

Mr. NEWMAN: Prof. Dean also said last night that it did not make much difference what size the granules were in churning. I would like to know if he thinks it makes much difference in adding the salt?

Prof. DEAN: I qualified that by saying "with a combined churn and worker." The only difference is that it enables you to distribute the salt more evenly if you use a proper worker.

Mr. ECHLIN: Do you think that pasteurized butter will stand high temperature in summer as well as the ordinary dairy butter, and hold its keeping quality?

Prof. DEAN: I showed last night that butter made from milk pasteurized at 185 was much better in every way than that made at the ordinary temperature. At the end of

three months it was still of the finest quality after being stored in a cellar, while the butter made at the lower temperature was off flavor—in fact rancid.

Mr. Everts. Will Prof. Dean give us the reason why there is more mottled butter in winter than in summer?

Prof. Dean: I believe that the chief cause of mottled butter is the uneven distribution of salt, and that on account of cold in the winter the salt is not so easily incorporated. I believe that the salt and the butter should both be of about the same temperature. I have noticed, also, that in winter the butter is apt to be drier, and there is often not enough moisture in it to dissolve the salt. The salt should be in the form of a brine, so to speak. In my opinion the best remedy for mottled butter is working the second time, With the combined churn and worker it is usually not necessary to work the second time, but working the second time is the best way to remedy mottled butter.

Mr. R. M. Ballantyne: We have used a combined churn and worker in one of our factories, and by working it for some time we got rid of the mottles. I understood Prof. Dean to say he would not advise the washing of curds. West of Toronto we wash our curds to some extent, and I have advocated the practice. We wash our curds at a temperature of 96 to 98 degrees. The chief reason for washing curds is to get rid of bad flavor. We found that if we washed some, and not others we had uneven cheese, and in order to preserve uniformity we washed all the curds. We have found that there is very little loss caused by washing curd. We found, indeed, that the average amount of cheese made from 100 pounds of milk was about the same as in the previous year when washing had not been practiced.

Mr. Webster: Where you wash off curd do you find any difference in the appearance of that curd? I have found some washed curd look as if it had been bleached with acid.

Mr. Ballantyne: We found that some curds that had too much acid were washed for the purpose of getting rid of it.

Mr. Brunel: Do you not find, also, that by washing curd you make a drier cheese? I believe in washing a tainted curd, but my experience has been that if you wash a perfect or sweet curd there is a tendency to have to dry a cheese.

Mr. Ballantyne: If a man washes all his curd he can get them so that the cheese will be all an even texture. I know that in factories in the west from which we got our nicest cheese, they washed their curd.

THE CONDITIONS ESSENTIAL FOR THE MANUFACTURE OF FINE CHEESE.

By G. G. Publow, Instructor Dairy School, Kingston.

I feel a bit shaky as I stand here, not so much on account of the men before me as on account of those able speakers behind me on this platform. The time has gone for a man to come here and tell you how to make curd, cut curd, etc. The Government has established Dairy Schools at convenient points in the Province where men may go and get instruction in all the details of cheese and butter-making. I will, however, speak upon some of the conditions essential for the manufacture of fine cheese. This means, 1st, a suitable building; 2nd, milk in good condition, and 3rd, a man in the factory who knows his business, and who will do it intelligently.

A suitable building for cheese-making is a building where you can control the temperature, keeping it clean and sweet, with good surroundings, having good drainage, and a place that is properly equipped with suitable utensils for the manufacture of cheese. See that all your utensils, from the test bottles to the thermometer, are of the best. The milk for cheese making should be sweet, from healthy cows, produced from good food, and brought to the factory under clean and wholesome conditions. It should be so sweet when put into the vat that the curd can be brought to the proper degree of firmness before too much acid has been developed. We want the farmers to realize this. Even if your makers do not tell you this, it is of the first importance all the same. If you have a maker who says that he can take milk of bad flavor, gassy and over-ripe, and make

good cheese from it, do not keep him any longer. (Applause). It will pay to let him go at once.

Farmers should have clean clothes and hands when milking. If you have been working around the barnyard wash your hands carefully before milking. If the weather is warm the patron should cool the milk to 60 or 65 degrees. Bail the milk in a pure atmosphere, and that will cool it, when the temperature of the atmosphere is not above 70 degrees.

A great evil has been creeping into the cheese business of late, and that is the shipping of cheese in too green a stage. It is folly to produce cheese to be sold when two days old. I know of no better way of ruining the cheese industry of the country than by shipping green cheese only a few days old. (Applause). If this practice is persisted in we shall certainly lose our reputation as the great cheese producing country of the world. I have known lots of cases where the cheese made on Wednesday had gone to Montreal on the following Friday. I have even known cases where cheese taken out of the press one day had been sent off the next day. The old country market wants a cheese that will bore close, rub down and be silky, and that will have a good, sweet, nutty flavor, and you cannot get that quality of cheese unless it has been properly cured. No cheese should leave the factory under two weeks old. It is true that this cheese from over ripe milk will bore close, and you will not have any gas-holes. But they will break down after a few days and have no body. The buyers too often pass these green cheese, and possibly hold them in Montreal for a few weeks. They go to Great Britain, break down, are bitter in flavor, and give us a bad name. These cheese also usually have a bad appearance, and they can never be good and marketable. The longer they are kept on hand after leaving the factory the more discredit they bring to the man who made them and the country that exported them.

Put up the building for the manufacture of cheese in the best possible condition. If you are going to put up a new factory, plan it so that the sanitary conditions will be perfect. Put in the floors, whether wooden or cement, so that there will be no leakage. Never wash curd with water that is not pure; above everything, have good pure water for the use of the factory. As the utensils are all washed with water that water should be of the very best. Bad water will be sure to show later on in the finished product, either in bad flavors or in pin holes in the cheese. I would also say to the patrons, see that you send your milk to no factory that is not properly equipped, so as to ensure the best possible returns to all concerned. It is of no use to have good cows, to feed them well, and to care for the milk, and then send that milk to a man who will not give you the best results. Patrons should make a more careful selection of their cows, and then feed them food which will give a good flavor to the milk as well as a generous flow. But feed no turnips, feed no leeks, feed no rape, or any other thing that will give bad flavor to milk—feed none of these to milking cows. (Applause) These men in Montreal and England do not want to buy cheese that have any of these strong flavors, no matter what the appearance of the goods may be otherwise. You should not hold the cheesemaker responsible if the milk has any of these vegetable flavors. Of course he should try to detect these flavors, and prevent such milk from coming to the factory. Cheese is an article of food, and it is to the interest of patrons that milk sent to factories, whether for butter or cheese, should have none of these vegetable or weedy flavors, so that the finished product may be of the very best quality and reflect credit upon both patron and manufacturer.

Now a word or two as to makers. Stop hiring men because you get them cheap. Perhaps you think I am rather fault finding. Well, we have come to the time when it is necessary to find fault with the practice in some sections of cutting down the price of the labor of the men who are making the cheese. I would say engage no man who is not qualified to make fine cheese, and to make the most out of the milk. I find that a large proportion of the inferior cheese is made in small and poorly built factories where the maker is working for small wages—in a great many cases not getting enough to enable him to engage sufficient help to handle the milk and do himself and his patrons justice Get a man who will make you fine cheese and pay him fair wages In conclusion I would say to cheese makers, stop making cheese that will break down in a week from the time they are made. Make them so that they will improve for at least two months, for they do not reach the consumer in much less than that time, and it is the

condition they are in when they reach the consumer that will make or mar our reputation.

Mr. L. L. Gallagher: I would suggest that all farmers have their names plainly stamped upon their cans, in order that there may be no confusion or mixing of cans at the factory. There is a danger of one man's can being mistaken for his neighbor's. This, too, would prevent the driver from slipping in his own can instead of another containing better milk when the inspector was taking samples.

SOME NOTES ON CHEESEMAKING.

By J. A. Ruddick, Ottawa, Ont.

We, as Canadians, are in the habit of boasting a good deal about the great progress we have made in the art of cheesemaking, and we are fond of congratulating ourselves upon having secured such a prominent position with our cheese upon the world's markets. No one can accuse us of being unduly conceited in this estimate of our attainments, for the whole dairy world admits that we are fully justified in having a good opinion of ourselves in this respect. There is, however, always an element of danger under such circumstances, and more than a possibility that the spirit of contentedness may grow to such an extent as to become a barrier to further progress. It will not do for us to be satisfied with having reached a position where the quality of our cheese is said to be superior to that of our competitors for the import trade of Great Britain, although there is no doubt that has been our ideal in the past to a very large extent. We should look higher, it seems to me, and aim rather to equal the best English and Scotch goods, which still sell from 3 to 4 cents per lb. above the ruling price for finest Canadian. I think it is well to understand that the great volume of our cheese exports, as compared with other countries, must have helped very materially in winning for us the splendid advantage we now possess, so that our ascendancy is not altogether due to superiority of quality. Then there is this to be kept in mind, that other countries are working hard in the direction of making improvement, and some of them have excellent systems of instruction with large appropriations of money to back them up, and natural advantages fully equal, and in some respects superior, to ours

In view of what I have stated, I shall confine myself on this occasion to pointing out some of the main defects in the quality of Canadian cheese, and endeavouring to make some suggestions as to how such defects might be remedied or avoided, rather than to attempt any systematic treatment of the subject of cheesemaking.

During the latter part of the past season, I was, as some of you know, stationed at Montreal, where my work as Official Referee, brought me into contact with a great deal of the inferior cheese passing through the warehouses But apart from my official duties, and through the courtesy of the exporters, I had exceptional opportunities for studying the general character of the cheese made during the season just closed.

As the standard of quality upon which all sales of cheese are based is what we know as "finest", it may be well, in the first place, to give as nearly as possible a definition of this term as applied to quality in cheese.

"Finest" cheese must be clean in flavor, have a fairly close solid body and smooth texture, be even in colour, with fairly good finish, good rinds, clean surfaces, not too large for boxes, which should be strong and close fitting. This standard does not by any means imply perfection, for we may have cheese not only clean in flavour, but possessing that rich nutty flavour which is demanded in a strictly fancy article. Slight allowances are made in the body and texture of "finest" cheese, which are not admissible in higher grades. The month of manufacture is also taken into account; that is to say, the flavour of cheese made during hot weather is not expected to be quite as fine as that of autumn manufacture, nor is "fodder" cheese expected to have the quality off the best grass fed. Thus we have "finest fodders", "finest Julys," "finest Septembers," etc. Concessions are made to certain districts which do not yet receive the highest current price for cheese.

The foregoing definition of finest cheese is not an arbitratory one laid down by any person or persons, but simply the outcome of the combined commercial experience of those who deal in cheese on the Canadian market.

Having said so much by way of introduction we will now turn our attention to some of the specific defects in the quality of Canadian cheese. I propose to mention them in the order of their prominence or frequency of occurrence, according to the information in my possession drawn largely from my experience of the past season to which I have just referred.

Open cheese. This defect stands at the head of the list, and I am sorry that I have to say so, because, as every well informed cheese-maker knows, it could be avoided by bringing more skill and better judgment to bear on the manufacture. Openess, to that extent which constitutes a fault in finest cheese, is due to a lack of sufficient development of acidity in the curd to give it the proper mellowness and plasticity before going to press, and also to some extent due to negligence in pressing. Of course it is well known that some curds will not make close cheese under any amount of pressure, but on the other hand no curd is ever made into close, solid cheese unless heavy pressure has been gradually and persistently applied. I think the trouble often arises from mistaking the flakiness and softness, due to a little extra moisture or an unusually high temperature, for a sign of proper maturity. Flakiness, or that condition of the curd when it can be separated into thin layers, is more or less of a mechanical result arising from the particles of curd flattening out, owing to the tendency to spread when the pieces are piled one on top of the other— a tendency which is increased by extra moisture or heat. If the curd is not piled, or is piled in such a way that there is no chance for spreading, the flakiness does not appear to the same extent, although the curd matures just the same. Open cheese are rather more common in Eastern Ontario than they are in the West, and it is worthy of note in this connection that the cheesmakers of Eastern Ontario are more inclined to practice high piling than are their brethren west of Toronto. Maintaining a high temperature too long and mistaking the resulting softness for proper mellowness will give a cheese which is open, stiff (corky), rather greasy and loose.

Weak Cheese may be described as the extreme of open with some excess of moisture.

Some difference of opinion exists as to the best means of testing the curd to ascertain when it is ready for salting and pressing. My own idea is that there is no more reliable test than the hot iron, for although it is not exactly a measure of acidity, it indicates what is probably the effect of acidity, which is more important. The curd spins out in fine threads when touched to the hot iron, in proportion as it becomes mellow and plastic, and should not be put to press until it draws from about $1\frac{1}{2}$ to 2 inches. The old fashioned test which takes account of the odour of the curd when burnt on the iron is not to be despised. In the early stages it resembles burnt milk, but, usually about the time it is mature, the odor changes to a rich, pleasant creaminess. Then again curd which is fit for pressing will mould readily when squeezed in the hand, and retains the shape into which it has been pressed.

The alkaline test is advocated by some, and it is used in the same manner as for testing cream, by taking a sample from the whey which drains from the curd. I have not had an opportunity of using this test much myself, but most reading cheesemakers are familiar with the work of Lloyd and others in this connection. Lloyd found that in England the whey draining from the curd should have about one per cent. of acid before the curd was salted. The objection to this test, as it appears to me, is that as the solutions used in making it must always have the same standard strength, and as they are very liable to change unless proper precautions are taken, the danger will be that in the hands of a person without chemical knowledge, the change in strength will be unsuspected or unnoticed and inaccurate work the result. Unless some means can be devised for ensuring permanent strength of the solutions, which will be understood by the cheesemaker, I do not see how this test can ever come into general use, although I believe the principle of it is correct.

Not Clean in Flavor is a very general term which includes all bad flavors not otherwise classified. Under this head we have such taints as feed flavors, those due to absorption of odors when the milk is exposed to them, cows having access to stagnant water, bogs or ponds, filth finding access to the milk at the time of milking, putrid whey being carried in the cans which are not properly cleaned afterwards, cloths being used under the covers of the cans, &c. As regards feed flavors, it does not appear to me that we have much real trouble of that kind in Ontario, if we except such typical taints as

turnips and rape, and possibly green clover when fed to excess. The expression "weedy flavor" is one which is rather loosely applied and is very often misleading.

"*Off*" *Flavored* cheese are very commonly known as "stinkers" in the trade, a name which is expressive enough if not very elegant. This flavor does not usually appear until the cheese begins to "break down," and it is much more likely to be developed when the cheese are cured at a comparatively high temperature. One of the most conclusive points brought out in the recent experiments in curing cheese at different temperatures, is that many of the cheese cured in rooms where the temperature was uncontrolled, went "off" flavor in three or four weeks, while other cheese from the same batches, cured at a temperature not exceeding 65 degrees, remained sound in flavour indefinitely. Of course there were bad cases where both cheese went wrong, but the one kept at the higher temperature was much the worst. There is undoubtedly a time in the life of every cheese, when bacterial growth ceases, or nearly so, and if the cheese retains its desirable flavor until that stage is reached, it will keep good for a very long time.

Acidy Cheese. Some distinction is generally made between different degrees of sourness, and cheese which are only a little mealy in texture and more or less faded in color, are called "acidy," as against those which are distinctly sour. There was a lot of acidy cheese made during September and October of last year, especially in those factories where the practice of making only every alternate day was followed. The weather being unusually warm for the time of year the milk became over-ripe and worked too fast. I am afraid that the injudicious use of starters were also responsible to some extent. The development of too much acid while the curd is still in a soft condition, is the cause of these acid cut cheese. As it is much harder to get the curd firm in the fall on account of the extra fat, the milk should be set sweeter than it is earlier in the season.

"*Fruity*" *Flavor.* This peculiar flavor seems to be getting more common every year, and I regret that I am not able to give any very definite information as to its cause, beyond saying that every indication points to its being of bacterial origin. For the benefit of those who may not be familiar with it, I may say that it resembles fermented fruit more than anything else, hence the name. It varies considerably and in some cases has a sort of strawberry character, while in others it is more like champagne cider or certain kinds of wine. There is nothing offensive about it; but, of course, like any other foreign flavor it is very objectionable in cheese. It occurs throughout the whole season, but seems to be more common during the autumn months.

Pasty cheese are simply the result of leaving too much moisture in the curd. We hear more about them in the fall when the milk is richest in fat, and the surplus moisture most difficult to get rid of. Some extra means must be employed at this season to get the curd firm. The milk should be set sweeter to keep the curd longer in the whey, and when it tests as much as 4.0 per cent. of fat, the so-called "cooking" temperature may be raised to 100 degrees and over as the fat increases. It is better to employ heat than to depend on too much stirring which is hard on the curd, to say nothing of the cheesemaker himself. If I was making cheese and found the milk was of such a character that the curd was not firm enough after standing in the whey for the usual length of time, I would increase the temperature until I got it right, no matter how high it had to go. The only effect of heat is to harden the curd by expelling moisture. There is one thing which I would not do, however, and that is to allow the temperature to run up on a fast working curd, and then immediately run all the whey off, while the curd is still soft. Under the higher temperature and in its soft condition the curd matts together very quickly, and it is next to impossible to keep it from becoming lumpy. Many acidy and mottled cheese are made in this way. It is better to continue stirring in the whey, running off as much as possible without tipping the vat, until the desired firmness and elasticity have been secured in the curd.

As I stated in the beginning, the most conspicuous fault in our cheese according to the classification which I have given, is weak, open body. However, if we group all bad flavors together we find there are more complaints against quality under this head than under any other. Flavor is undoubtedly the most important quality in cheese, and it is unfortunate that the cheesemaker has less control over it than he has over any other point in the manufacture. The flavor of cheese depends very largely upon the condition of the milk as received at the factory, therefore, the producer must accept a large share of the responsibility involved. Bad flavored cheese may be made from first-class milk, if

the factory and its surroundings are not kept in a clean sanitary condition, or if rank flavored starters are used; but on the other hand no amount of care or skill will suffice to turn out a fancy article from tainted milk.

It is the maker's duty to study the character of the milk which he receives, in order that he may be able to criticize intelligently, point out defects and suggest remedies. He should have the power to reject all milk which will injure the product in any way. Theoretically he is supposed to have this power, but in practice he is allowed to exercise it only to a very limited extent. There are several things which combine to bring about this result. (1) There is the ruinous competition among small factories which induces them to accept without question milk which has been refused by a rival concern. (2) There are supporters of factories who admit the right of the maker to return milk which is not up to the mark, but only when it is the other fellow's milk which is being dealt with. If it happens to be theirs, they feel quite different upon the matter, and even if they do not come out openly and oppose the maker on these grounds they will find some other way to make it uncomfortable for him. Until it is distinctly understood that the cheesemaker must not be held accountable for the flavor of his cheese unless he has full control over the milk supply, and can take the necessary steps to regulate it without prejudice to his own interests, there will not be, I am afraid, as much progress in this direction as there should.

If there is only a hint to the effect that some patron of a factory is tampering with his milk by adding water to it or removing some of the cream, every other patron is up in arms at once and demands satisfaction.

Quite a considerable sum of money is annually expended for the purpose of checking this sort of thing, and yet the patrons of many factories lose infinitely more every year through the dirty bad flavoured milk which they in a measure compel the cheesemaker to accept. Many patrons of factories delude themselves with the idea that they are protected against loss of this kind by the tax which is levied, very often unjustly, upon the cheesemaker, when the buyer refuses to take the cheese at full market prices. The point is, however, that if all milk was delivered in first-class condition the value of the product would be enhanced very materially. To their credit it must be stated that many patrons do send good milk, and these men should be protected against those of the other class who lower the whole standard by their carelessness and indifference. Much more might be said on this point but my time and space are limited. Before I close my remarks, however, I wish to say just a few words concerning the boxes and the boxing of the cheese.

The complaints which come from England regarding broken boxes are very serious indeed, as many as 50 per cent. of some cargoes having been reported in that condition when landed. No doubt rough handling is responsible for a large proportion of the breakages, as has been shown by the improvement which has taken place since the agents of the Dominion Department of Agriculture began sending back reports on the subject, and these reports were forwarded to the representatives of the shipping companies interested. There is still much room for improvement, but the information which has been gathered, through the various agencies of the Department bears out the statement that fully 10 per cent. of the boxes from some districts are landed in a broken condition, even with the most careful handling possible, where such large quantities are dealt with, and the work is of necessity done with considerable rush.

It is just as important that our cheese should arrive on the British market in boxes which present a good appearance, as it is to have the quality good in other respects. It is folly for us to tear down with one hand what we build up with the other; yet that is what we do when we put good cheese into boxes which are too flimsy or ill-fitting to stand the handling in transit. What is required is that the bands of the boxes should be made heavier, and the cutting of this material done by machines which do not shatter the timber, causing it to split readily. Then the boxes should be close-fitting—just large enough to go on freely. I need not add that the edge of the box must be trimmed to fit the cheese. It is quite a common thing to find cheese in boxes which are from half an inch to two inches larger in diameter than the cheese are. It is with such as these that the largest proportion of breakages occur.

In some districts the weight of the cheese has been increased fully one-third without a corresponding increase in the strength of the box, and it is not reasonable to expect a box to carry a 100 lb. cheese as securely as one of 65 or 70 lb. weight.

There is another phase of the box question which deserves special mention, because it was the cause of heavy losses during the latter part of the past season. I refer to the matter of damp boxes.

When cheese are put into boxes with the ends made from improperly seasoned timber, or into newly made boxes with the rims still wet from the steaming, the result is a vigorous growth of blue and white mould on the surfaces, and the rims become soft and pasty, or even rotten in extreme cases. The remedy it seems to me is to have enough boxes for the season on hand not later than the early part of September, when the weather is still fairly warm. If by any chance a factory is compelled to use newly made boxes late in the season, the precaution should be taken of storing them in a *warm* place for as long a time as possible, with the covers removed to facilitate drying out. During the summer months when the air is warm and dry, and thus absorbs moisture rapidly, there is no trouble from damp rims. Indeed the boxes often become too dry and brittle, a fact which tends to increase the percentage of breakages During the autumn when the atmosphere is cold and damp, the conditions are quite different, and green lumber, or wood which has been soaked in water, will retain its moisture unless some special means, such as I have indicated, are taken to get rid of it.

There are many more points which would bear discussion, but possibly this paper is long enough already. I have dealt principally with some of the faults in the quality of our cheese, not because there is nothing to be said on the other side of the question, but because the line which I have taken was the one which it seemed to me would be most useful at this time. I am afraid that dairymen generally do not realize how much room there is yet for improvement, and until they are convinced on this point progress will be slow. Cheesemakers and factory representatives usually get complaints of this kind direct from those who buy their cheese, and because these men have an interest in the matter which would be served at times by representing the quality to be worse than it really is, their reports are not always believed. It is desirable, therefore, that these things should be pointed out by someone who is entirely independent, and who has no other interest in the matter beyond a wish to see Canadian cheesemaking not only continue to occupy in the future the same prominent position which it has for some time past, but press on to a still higher level.

PLAIN SPEAKING BY MONTREAL CHEESE EXPORTERS.

Mr. James Alexander, Montreal: As a cheese exporter I am pleased to be here, and listen to the addresses and discussions. I have been interested in hearing Mr. Publow and Mr. Ruddick point out the difficulties with which those in the cheese business have to contend. The unfortunate position I occupy is that of the man who takes this cheese and sends it to England, brings back the money for it, and distributes it among the farmers. Sometimes I find that I do not get enough money back to pay myself for the trouble. (Laughter.) It is almost impossible to convince people who have not had the experience of Mr. Publow as to the number and the nature of the difficulties we have in handling cheese. The great wonder this year is that we came out as well as we did. You are used to having pleasant things said to you, but I am not going to say pleasant things to you to day. During the past twelve months we have gone back five years in the quality of our cheese. But is it any wonder that our reputation has gone back, when we have been shipping cheese from our factories when only a day or two old? Some of the makers have got too cunning and too greedy. They have been trying to sell whey for cheese. Some have put in a lot of whey, and have done it in so cunning and clever a manner as to deceive us poor, innocent buyers. (Laughter.) This sort of cheese will break down in a few days. When the English people get hold of that cheese they will say, "What is the matter with this Canadian cheese?" We have been making a poor class of cheese that will not keep, and we must stop that right away. We want a silky, soft, meaty cheese, that is properly matured, and that will not break down in a few days or weeks. The exporter has to suffer from your faults as well as from his own. There is not a stinking barnyard or dairy in the country that we have not a repetition of in our store. We get acquainted with those odors there, and know the exact locality just as if we had

been in the dairy itself. I would ask the dairymen here not to make those over-moist cheese this coming season. And we do not want any April or November cheese. (Applause.) If I had the power I would have a law passed that all these poor winter cheese should be confiscated and given to the poor. There is no such thing in the dairy business as standing still. The trade must grow and develop. We must do away with half of these little factories. I do not like to tread on the toes of the small factorymen, but this country is large enough to have bigger factories. If I were in a position I would not allow these small factories to exist. I believe that no factory should run less than 300 or 400 cows, and no man should be permitted to run a factory without having proper credentials of fitness, and that all factories should be licensed.

Mr. A. Hodgson: I am just beginning to realize what a lot I must have missed in not having been to your conventions oftener. This is only my second convention, and I believe if I had come earlier and more regularly I should have learnt a great deal of value to me in my work as a buyer and exporter. I have learnt much of interest and of instruction already. I must admit, however, that it has been a big surprise to me to learn that we have been getting cheese a day old out of the hoops. I am afraid you will be shipping the milk to Montreal next to be paid for as cheese. (Laughter). Some persons say to us, "If you do not want them why do you take them?" Now if you make them we will have to buy them, and try to make a dollar a box on them. We would rather not have you make them, though. We have as many cheese now in Montreal as we can handle, and if you begin to make early in the spring you will certainly have an overplus of old cheese, and you will not get much for that early spring cheese. We are indebted to the Dominion Government for sending Prof. Ruddick to Montreal. Human nature is human nature all the world over. I know if I was a maker, and got a cut from the Montreal dealer, I would think they were not just the thing. But if you were in Mr. Ruddick's or Mr. Publow's position I think you would find that there are not so many cuts as there should be. The cheese-maker is expected to make good cheese out of poor, thin milk, and he fails to make a good cheese because he accepts poor milk. I can echo what Mr. Alexander has said. You must remember, also, that the cheese is not finally disposed of by the consumer until two or three months after it has been made, and your success depends not so much upon the impression you make upon the cheese buyer, as the effect left upon the man in England who eats that cheese. The best friend you can have is not the man who will pat you on the back, but the man who will come right up to you and manfully tell you your faults. One fault about our cheese this year has been that it has been ripening too quickly, and on this account we have lost ground that it will take years to recover. This is applicable to the members of the Eastern Association, the Western Association, and the Quebec Association. There has never been a year when we who handle the goods at Montreal have had more complaints made to us, and the Montreal merchants have never had a year when they had to lose more in making up to their old country customers Some of the cheese when skinned through have brought loss to us. We want a more meaty cheese; but of course there is a happy medium. I have had some cheese come to my warehouse which seemed good in flavor and appearance, but the first hot spell that came along caused them to open up like pricked balloons You must have your cheese made like it was three or four years ago, which got you such an excellent reputation. You perhaps think that we are putting too much blame on the country buyers in passing cheese a day or two old. It is the easiest thing to be deceived on the first inspection. We have confidence in our country buyers, or we would not employ them. There is another growing evil, and this is the outcome of striking too hard a bargain with your cheese-maker. The man you get for the cheapest price is usually not the best man to have. We have noticed lately in a number of instances that rancid curd has been rolled into a ball, and been put in the centre of an otherwise good cheese. A man was charged with having done this, and he denied it. I said, "We shall see." Then I cabled to the dealer in England who had complained, and asked for the brand, etc., and to send it back if possible. The reply came, and I was glad that the cheese was stamped in that particular instance. And that cheese was sent back, and it went right up to Brockville. The man had not a word to say, but I am told that there was a very hot time between the proprietors of that factory and the cheese-maker. (Laughter and applause). I can also give you twenty instances in my own experience last year where a lot of colored curd was put in the centre of a white cheese. One man actually boasted to

me that he had done that trick scores of times, but that was the first time he had been found out. The cheese-buyer is beginning to feel he is a long-suffering man, and has to bear a lot. The cheese-maker, too, suffers many a time because he has not the courage to put a distinguishing mark upon a few culls. I have known where cheese have been tested, and because four or five in the hundred were wrong the whole lot has been condemned, whereas these might have been the only ones off flavor, and if culled at the beginning the others might have gone through as first-class cheese, as they really were. I am returning to Montreal strongly of the opinion that the merchants should make a point of attending these gatherings, and discussing the dairy business with those who meet here. (Applause).

Ex-Governor HOARD: Is not this putting in a ball of poor curd in the centre a new form of "filled cheese?" (Laughter).

The PRESIDENT: This trick is not very general, I am glad to say. Such work, however, is helping to greatly injure our cheese industry. The way of some of those fellows is almost past finding out.

Ex-GOVERNOR HOARD: I am delighted to hear this. I have borne the shame of "filled cheese" for many years, and I am glad that some of your wickedness is being found out. (Laughter.) Seriously, you cannot afford to let that thing go on. (Hear, hear.)

Mr. EAGER: A great many cheese-makers I have talked with find fault with the different weights, at the factory and at the warehouses.

Mr. HODGSON: Mr. Eager evidently refers to the lack of uniformity in weights. Sometimes we will get a package of cheese where the weights will run from 60 to 90 pounds. The English dealer is a suspicious man. If I ship a number of boxes from one factory ranging from 60 to 80 pounds, he will say that these are not from the one factory, and that I am sending him the make of several factories. Make a uniform weight of cheese. Stencil the weights on the cheese. See also that better boxing is done. I have gone into warehouses in England, and have seen piles of boxes without even the vestige of a rim covering the cheese. Box-makers are suffering from keen competition, and they are sending us boxes to Montreal that are unequal to the work. These boxes have to be rolled from factory to warehouse, from warehouse to ship, from ship to warehouse, and from warehouse to customer, till there is scarcely a vestige left of box or cover. It has been a common occurrence for a man to make a 90 pound cheese, and try to put it into a box intended only for a 60 or 70 pound cheese. The Montreal merchant does not want to send such broken cheese to the British dealers. (Applause).

ADDRESS.

By Hon. JOHN DRYDEN, MINISTER OF AGRICULTURE FOR ONTARIO.

There are now so many groups of farmers representing different branches of agriculture that it is difficult for me to find time to meet them all in their annual conventions during any one year, but as I had not been present at this Convention for some time, I felt that whatever others might be missed, I must not miss this one. I arrived late last evening and found no room left at any of the hotels. I come to the convention and find your hall filled. I learned that the town in the afternoon was so crowded that hundreds of people could not get near the hall. I therefore came to the conclusion that the hotels were too small or two few, that the hall was too small, and possibly the town itself was too small, and that the only thing large enough was the President himself. (Laughter).

This Association has always been a useful one, but in my judgment it never did better work than it is doing at the present time. We have here at this meeting a combination of varied interests; we have the man who owns the cow and the man who owns the factory; we have the man who manufactures the finished product, and the man who finds the purchaser in the best market. We have also the men who teach the "how" and the "why," and, if you will allow me to include myself, you have the Minister who provides the sinews of war, and who is here to crack the whip and make it go. The President would say that this is a great combination, and with all those actively working it is no wonder that when he goes to the West he is able to say that the dairy industry outclasses every other industry relating to agriculture in the country.

I wish, however, to point out that, if we are to meet with the greatest success, it is necessary that all these persons should work harmoniously together. When in Chicago a few weeks ago, I was greatly interested in visiting one of the great packing houses in that city. I found that there were hundreds of men at work in that institution, but that each person had assigned to him a particular duty to which he gave his whole attention without meddling with anything else whatever; his work was assigned and he did it perfectly. In handling a car of hogs which were going through the institution, I saw that the first man had a single duty to perform, which was to fasten a noose upon the hind leg of the hog. Touching a spring, the hog soon found itself suspended in the air and passing over an iron railing towards the next man, who, standing ready with a sharp knife in his hand, made a swift motion and the life of the pig was taken, while the pig passed on to the next, to whom was assigned his special duty, and so on through the lot.

But in that case there was one man not represented in the institution, who was after all the most important of the whole. This was the man on the farm who furnished the raw material, which they undertook to prepare, and provide the consumer with the finished product. It was the farmer who held the key to obtaining the highest success. If the live hog was unsuitable, no amount of expert workmanship could produce the product required. So, I affirm, is it here; the man among all this combination that I have suggested who owns the cow and supplies the milk—which is the raw material—is the most important factor. If filthy stables, careless milking, uncleansed milk-cans, etc, fill the raw material with unpleasant odours and foreign substances, I am afraid that no amount of skill on the part of the manufacturer, or any science which is anywhere obtainable, will prove sufficient to remedy these defects. If I am right in these statements—and I do not think they will be contradicted—the question presents itself: how shall we reach this man? I am afraid he is not here at this convention. If he were, he would have been convinced by listening to Mr. Publow and those who have preceded me. If he is not here—if you cannot obtain his presence at these conventions—then we must go to him with our education. You ask, why? My answer is because we are desirous of obtaining a better product. I have been ashamed as I listened to the addresses delivered here this morning to discover that instead of moving forward, we are going backward. This must be remedied if possible. I see by your financial statement of last year that you collected $2,000 in fines. This itself is a proof that there is something wrong in connection with the men who provide the raw material. It is a proof that the inspector has found him out in wrong doing and has punished him. He does not understand that integrity in connection with this business means added wealth. When a man does wrong, it may be proper to punish him, and I shall not shield him from the punishment. I have nothing but contempt for the man who, without regard for himself or his neighbor, undertakes to spoil the product which is his only means of obtaining wealth. The use of the law in this case may seem to some to be the best possible process, but I want to ask whether there is no better way. Humanity in general does not like to be driven against its will, and farmers, especially, resent this kind of treatment; but they do like to obtain an extra dollar. I ask, therefore, cannot your inspectors or instructors, as I chose to call them, spend an evening in some of these districts with the patrons—with the men who provide this raw material—and teach them that we are all tied together, that one man doing wrong hinders not only himself, but offends against the whole community; that it is a serious business refusing to provide the finest raw material out of which to make these products that it is possible to produce. It strikes me that if you can teach him a better way, you may lose something of the fines imposed, but you will certainly gain a much better product.

Then, are there not in the country many weak factories which do not receive attention from your instructors for the reason that they do not pay the fees necessary to obtain it? These are neglected. Ought they to be neglected? They help to supply the sum total of our production, and so far as it is inferior, it injures the output of the whole country. It will be remembered that last year I asked the Legislature to add to your grant. It was marked in the estimates as being given "specially for instruction." I hope, therefore, it will be used in the direction I have indicated.

There is still another thing that I wish to mention: There are parts of our country, and important parts, that are never touched at all by these conventions. Our Province is divided into two parts—east of Toronto and west of Toronto. The eastern convention

devotes most of its attention to the eastern portion of the district east of Toronto; the western convention deals similarly with the territory to the west. The result is that there are seven or eight counties in the immediate centre around Toronto—including Ontario, York, Peel and Simcoe—which never receive any instruction from either I wish now to make a public request to this Association, and that is that next year they come as far west in their district as Whitby. I have in my pocket a letter from the Mayor of that town indicating the wish of the people of that district. They wish to have the light of the gospel which you preach in connection with furnishing pure dairy products for our people and the world. It is a Macedonian cry that I bring you, and I promise that if you go to Whitby you will be received with open arms, ample accommodation will be provided, and you will do yourselves credit and be a blessing to the community.

These are days when most of our people are receiving new inspiration because of the possiblities that are presented in the development of what is called New Ontario. I have given my voice and my influence towards that end. I intend still to do so; but I point out to you that there is still a great necessity for attending to the further development of Old Ontario. Whatever other public men may do (and there is no one in the Cabinet to which I have the honor of belonging who will not take this position), I wish to say that, so long as I have a place there, there will be one man who is ready to demand that Old Ontario shall receive its share of attention.

Mr. James in his address last evening pointed out how much greater the possibilities were for agriculture in Old Ontario than for all the other industries that are likely to spring up in the newer parts of our Province; and he said that while it was proper and right to attend to the development of our iron and our forests, all these combined multiplied by ten would not reach the amount of wealth that might be produced by agriculture in the remaining parts of the Province.

I want now, Mr. President, to congratulate you on the fact that you have had at your convention the presence of the representative of Her Majesty, the Queen, in Canada. Lord Minto, good soldier that he is—patriot that he is—never did a more patriotic thing than when he consented to be present, in company with Lady Minto, and to open your convention. He has added an importance and dignity to the work of this convention that could not have been given to it in any other way. The fact that this was accomplished has made me feel joyous and happy ever since. I want to say, further, that our public men are watching us in our efforts to develop agriculture. Our commercial men everywhere are intensely interested, and when the Governor-General helps, we have an added influence towards better production in this direction. So I say that with our good Queen of England interested in agriculture, and the proprietor of the finest dairy in the world—with her son, the heir apparent to the throne, the owner of a fine farm in England, and taking prizes at the great shows of that country—with Lord Roseberry, one of the leaders in Parliament, and other renowned gentlemen equally interested—is there a man, woman or child in this country living on a farm anywhere who needs to be ashamed of this profession? It is a day in which you who are the workers in this great field may well hold up your heads and feel proud of your position. I desire that you should learn all you can, and that more than ever you should bring into your business that intelligence and that skill, without which the best results can never be accomplished. Our boys went to South Africa and did well. They have given Canada a name which she could never have obtained in any other way; but is there not a part equally important, which you and I who have remained at home ought to undertake? What Canada wants of her sons to-day is honest service. Let there be no shirking—let there be no holding back, but let us honestly and faithfully do the part that is assigned to us; and every day as you go forth to your work whatever it may be, I should like that you should be inspired with a feeling of patriotism—that while you are working for yourself on your own farm, you are doing your best for your country; and so let the words ring out from day to day—Hurrah for Canada.

Mr. McINTOSH: The President remarked to-day that the farmer's butter had no quality. I think he ought to take that back.

The PRESIDENT: How much of it? (Laughter.)

Mr. McINTOSH: I think Mr. Yuill and myself are as capable of making as good butter at home as can be done in any factory in Ontario.

The PRESIDENT: We are glad to have these isolated cases, but they are only one or two in a thousand. Mr. Yuill has a reputation as a breeder of dairy cattle, and a man who knows all about dairying, but he is an exception to the rule. Besides he has a wife sitting there beside him who is really the better man. (Applause and laughter.) But while there are a few of you good private dairymen and women, there are a hundred persons who are taking scores of ways of making this bad, poor, rancid butter. How are we to get a good name—the best name—for our butter? Simply by putting in a good man, carefully trained in our dairy schools, supplying him with proper buildings and plant, and letting him make us fancy butter according to the best methods. We should have our milk brought to one centre, and made by a man who has a certificate that he knows his business. Mr. Yuill could make money if he lived on the bare hillsides of Scotland where they can scarcely grow a blade of grass, and you also. (Laughter.)

Prof. ROBERTSON: I want the President to take that back—what he said about the hillsides of Scotland. (Laughter.) He libels the most prosperous farms in the world. Bare hillsides, forsooth!

Mr. EVERITTS: I was delighted with Prof. Dean's address yesterday. As he suggested then, you may find a neighborhood where one man will take the best care of his milk and his utensils, but where his neighbor will not wash his separator oftener than twice a week. There are isolated cases where farmers are starting dairy work, and where the country is new, that the use of the hand separator is all right; but where men talk of turning hand separators in well settled localities, under the noses of cheese factories and creameries, as it were, they are retrograding. We have had men tramping the sidelines and concession roads urging people to put in these hand separators. It was something like what we experienced with lightning rod agents. They were willing to rent the separators, but if anything went wrong the separator belonged to the man who had rented it to the farmer. The dairy business should be run on the co-operative plan, for in that way, and only in that way, can we make a uniform article of butter or cheese.

Mr. GARDINER: I would like to ask Mr. Ruddick if he thinks the opening of cheese is altogether due to high temperature.

Mr. RUDDICK: I attributed it largely to insufficient treatment before putting in the press. If the curd happens to have too much moisture left in it when whey is removed there is a tendency for it to spread. If the curd is piled one above the other it will be likely to spread out, but if piled carefully there will not be so much tendency to spreading or flakiness.

Mr. COAD: Do you advocate the hot iron test?

Mr. RUDDICK: I do not think there is any more reliable test for acid. When making cheese at one time I discarded the hot iron test, and depended chiefly upon the condition of the curd. But I have since learned that the hot iron test is the best way to gauge the acidity of curd. I believe it to be a much better method than the alkaline test, because it is so hard to keep the solution of equal strength or quality. I never saw a curd that could not be fairly tested with the hot iron. I know that there are certain times when the curd gets into a greasy condition, and does not appear well on the iron, but taken all together the hot iron is the best test we know of.

Mr. WILSON: Do you not think that too high piling will make the curd open?

Mr. RUDDICK: I do not think that the high piling will do so of itself, but the high piling makes it appear to be matured before it really is. The high piling exposes the curd to the air, and in that way facilitates matters. I do not think there is any particular danger in rapid development of acid if the development does not take place when the curd is too soft; for in such case it will result in a milky condition of curd. If you get it firm before the acid gets a fair start it gives the curd an elastic condition. Sometimes, too, the milk is found in an abnormal condition, when there is not a sufficient amount of casein or curdy matter to make a properly solid structure, and in that case there will be a tendency to greasy cheese. It has been clearly brought out on more than one occasion that owing to conditions of pasturage or climate the casein has fallen off while the fat has remained as usual, and the milk has thus got into an unbalanced condition. In such cases the only cure has been to have a high temperature in cooking. I think we have been too careful about sticking to the 98° point in cooking. I cannot see any reason why curd should be heated exactly at that point. Sometimes it is well to make the

temperature higher, and sometimes the best results are given by cooking below 98°. The cooking should be regulated by the condition of the curd.

Mr. DUNHAM: What temperature would you recommend for greasy curd?

Mr. RUDDICK: That will depend upon the occasion. The lower temperature you handle the curd at, the firmer it is likely to be

Mr. DUNHAM: Would you make any difference in pressing?

Mr. RUDDICK: I do not think I would. By putting on full pressure you might see more fat on the outside, but perhaps it is better that the fat should be on the outside than remain in the cheese.

Mr. GARDINER: I find that we always have trouble with grease when we get milk that is two or three days old.

Mr. RUDDICK: That is one of the great causes of grease. Your experience is quite in line with the experience of others in that connection. In making cheese in the winter time at the Dairy School we had to hold some of the milk for some days. It is a well known fact that the casein changes or varies under certain conditions, and does not form as solid a precipitate, or as firm a structure, as when the milk is fresher or in more normal condition. The milk appears to loose some of its power of coagulation when it gets old, and does not hold the fat so firmly. This matter of greasy curds has appeared to be worst at very dry seasons. It has been found, too, that the composition of milk changes considerably when cows have not sufficient water in dry periods. At the Geneva Station, in New York, they have proved this fact.

Mr Ross: Then you would advise cooking at a lower temperature in order to incorporate the fat in milk that has a tendency to make greasy curd?

Mr. RUDDICK: Yes. The difference in temperature in cooking is an important point. Even the matter of two degrees has a considerable bearing upon this matter of cooking curd.

Mr. DEVLIN: Are you in favor of washing greasy curd?

Mr. RUDDICK: I have never practised that in my own work in cheesemaking. But while I was at the School at Kingston it was sometimes thought necessary to do so.

Mr. PUBLOW: Washing curd will not take the grease out of it, but it will prevent the grease from showing on the curd. It is better, however, to have the grease than to wash the curd with bad water, which is so often done. The best remedy for greasy curd is to use a good starter. Do not ripen the milk, but set it as soon as it is ready. Do not let it ripen in the vat. Use one per cent. or more of a good starter, so that you will shrink the curd well. The best way I know to stop the grease is to ripen it in the curd.

Mr. EVERTTS: Don't you think the best way to stop greasy cheese is to have the milk come to the factory in good condition?

Mr. PUBLOW: The best way is to bring the milk to the factory every day.

Mr. EVERTTS: Is not the casein more tender in the spring when the cows are fresh?

Mr. PUBLOW: The casein does seem to be tender at that time. It seems to have less toughness in its composition. In the spring time milk appears to be a week old when it is only two or three days old. If the casein is kept too long in the milk, and breaks down there, it will break down so much earlier in the cheese.

Dr. CONNELL: I think Mr. Publow's explanation is fairly correct. This weakness that appears in the casein is due, I think, to some fermentation that occurs in the old milk. Certainly there is no chemical difference in the casein in the milk from newly calved cows and that from cows which have been in milk for months. There may be some physical difference, but we cannot explain it.

Mr. ECHLIN: My trouble with greasy curd has almost invariably been in August. We have generally had it in dry weather. I have noticed the grease stop after we had a good shower of rain. Therefore I think we should not lay too much stress on this old or new milk question.

HINTS REGARDING CURING-ROOMS.

By J. A. Ruddick, Ottawa.

Mr. J. A. Ruddick, Government inspector of cheese for exportation, gave an address upon curing cheese, and exhibited samples of cheese made under the various conditions described below :

Heated Cheese. If the temperature of the curing-room is allowed to go much above 65 degrees the flavor and texture of the cheese is injured accordingly and we have what is known in the trade as "heated cheese." Such cheese lose the mild, delicate flavor of those cured at suitable temperatures, and the texture becomes rough and mealy, and not unlike an acidy cheese. At the age of two or three months these heated cheese have a short, tallowy sort of body, which distinguishes them from the waxiness of those which have not been exposed to unduly high temperatures. So much of our summer cheese has been of this character that we have looked upon it as something which was unavoidable, and therefore excusable, and for which no one in particular was responsible. It has been clearly demonstrated, however, that by adopting certain measures, we can overcome this serious defect, and improve the quality of our hot weather cheese to a very great extent. Such a result would improve our position in the market very materially, by increasing the consumptive demand, and enabling us to compete better with those who do not labour under the same disadvantages of climate as we do. It would also enable us to meet the demand for a softer, more meaty cheese without running the same risk of having them deteriorate too quickly. The British market wants a meaty cheese, but above all it wants one which will keep. It is freely stated that we have lost ground during the past year in trying to satisfy this demand, because our cheese have not stood the unusual heat on the other side as well as they would have done, had they been a little firmer.

The Dominion Department of Agriculture conducted a long series of experiments along this line, at the Carp cheese factory, during the past season. The curing-room was fitted by dividing it into three compartments No. 1 room was insulated and connected with a sub earth duct, and provision was also made for using ice to control the temperature. No. 2 room was constructed on a par with a first class ordinary curing-room with no special means of regulating the temperatures, while No. 3 was so arranged as to compare with many of the rooms of poor construction throughout the country.

The cheese made every day in each vat were then divided among the different rooms so that for every cheese in No 1 room there was a corresponding one, from the same batch, in each of the other two rooms. As these cheese were properly ripened they were sent to cold storage in Montreal. They were accurately weighed at the time they were placed in the curing-rooms, and again at the time when they were shipped. At the end of the season when all the cheese had been brought together they were divided into lots according to the rooms in which they were cured. A committee of the Montreal Butter and Cheese Association was asked to examine them, which they did without knowing the particulars concerning the different lots. The following is their report :

Report of Committee.

We the undersigned committee of the Montreal Butter and Cheese Association, appointed for the purpose of examining and reporting upon the relative commercial value of several lots of cheese cured at different temperatures, under the direction of the Commissioner of Agriculture and Dairying, beg to report as follows :

(1) That we have fully examined the different lots, and made careful comparisons as to their values upon an actual commercial basis.

—	Lot 1.	Lot 2.	Lot 3.
June cheese	10c. per lb.	9½c. per lb.	9 c per lb.
July cheese	10c. per lb.	9½c. per lb.	9½c. per lb.

(2) The foregoing table gives the general conclusions of the committee. If the cheese cured at the lower temperature are worth 10c. per lb. those cured in the other room have relative values which are given.

(3) The committee would add that the lots marked No. 1 have a cleaner, milder flavor, and show a more silky, waxy body.

(Signed) Jas. Alexander.
M. J. Farrell.
A. C. Winland
Alex. W. Grant.

Montreal, November 7th, 1900.

There is another very important feature of this question, viz , the matter ot shrinkage. As has been already stated the cheese were weighed when first made, and again when sent to cold store, so that the figures given are such as will apply to the conditions under which cheese are usually disposed of at the factories.

Table of Shrinkages

—	Room 1. Controlled.	Room 2. Good ordinary curing-room.	Room 3. Poor curing-room.
Highest temperature	65 degrees.	83 degrees.	91 degrees.
Average shrinkage	2.53 per cent.	3.95 per cent.	4.45 per cent.

	Per cent.
Difference in favor of curing at 65 degrees over good ordinary curing-room	1.42
Difference in favor of curing at 65 degrees over poor curing-room	1.92
Difference in favor of good curing-room over poor one	.50

THE PROGRESS OF DAIRY FARMING IN CANADA.

By Jas. W. Robertson, Commissioner of Agriculture and Dairying, Ottawa.

I desire to congratulate the dairymen of the Province on the progress which has been made in the industry with which they are connected. I offer my best wishes to the Dairymen's Association for still larger success than has followed its efforts in the past. These, as we all know, have been characterized by intelligence, practical ability, and co-operation.

There is room for both extension and improvement in every sense, in the dairy farming of Canada. At the beginning of the nineteenth century there were not so many people in the United States as there are in Canada at the opening of the twentieth. There does not appear to be any good reason why the growth of Canada in material wealth, population and influence should not be even greater during the next hundred years than it has been in the great country south of us during the century which has just closed We have more power and resources at our command than were available to any of the peoples at the beginning of the last century. We have still vast areas of unoccupied fertile land, and, as everybody admits, we have greater natural resources still largely undeveloped than have ever before been in the possession of a country of about six millions of people. To cite one instance, in the Province of Ontario the average yield of fall wheat for five years in the whole Province is reported as 20 5 bushels per acre, and of oats 34.5 bushels per acre.

Progress in Canada. These natural resources have always been with us, and whatever of progress has come has been due to the labors and intelligence of a thrifty people. The difficulties in the way of successful farming become greater and more numerous every year. These are chiefly difficulties to be successfully overcome by good management ; and as the difficulties increase, so does the need for enlarged knowledge and greater ability. Let me cite one instance of increasing difficulties.

When co-operative dairy farming was begun in some parts of the Northwest Territories about six years ago we received the cream from one farmer delivered in a fine, sweet condition every fifth day, during the summer time. With even greater care in cooling and cleanliness, cream from the same farm can now with difficulty be delivered in sweet condition every second or third day. The multiplication of bacterial forms of life causes the milk to sour more quickly. So it is throughout the whole range of farming operations. Insect pests and weed pests, diseases of plants, and partial exhaustion of the soil, are all serious difficulties which have to be faced with increased intelligence and organized effort. The history of the development of dairying in Canada illustrates some of the excellent results which can be obtained from intelligent organized effort. Organization is useful to bring about economical ways of doing things; and such a subdivision of properly correlated labor as to obtain the very best results in products, in profits and in increased ability on the part of the workers and the managers.

Help from Government Sources. Forms of help which a Government may with safety and benefit give to people like Canadians are quite limited in their character, although they may be applied in hundreds of various ways. I think it was James Russell Lowell who said of those restlessly energetic people who live to the south of us: "Every man is as lazy as he dares to be." If such a statement as that be true concerning the people who live on this continent, then the getting of something for nothing will likely be more mischievous than wholesome. But those forms of help which increase the intelligence of the people, cause them to develop ability in the carrying on of their own work, and promote co-operation among the farmers themselves, as well as between the farmers and the Government, are good, and good only. Such is the help which Provincial and Dominion Governments have extended to the dairy business. A few instances may be cited to illustrate the success of that policy.

In 1880 the exports of cheese from the United States to foreign countries were rather more than three times larger than from Canada. By 1890 the exports of cheese from Canada were about equal to those from the United States. By 1898 the exports of cheese from Canada were three times larger than those from the United States. The following figures show the increase in the value of exports of cheese from Canada:

	1880.	1890.	1900
Cheese exported.....	$3,893,366	$9,372,212	$19,856,324

In 1886, when the Government first began to give systematized educational help to the dairymen of this country, the exports of cheese from Canada were 78,112,927 pounds, valued at $6,754,626, whereas in last year (1900) we find that the exports of cheese were 185,984,430 pounds, worth $19,856,324, showing a very decided growth. At least a large part of that growth was due to the systematic, well organized and well directed efforts of different agencies, not only of the Dominion Government but of the Provincial Governments, dairymen's associations and boards of trade. During the period from 1886 to 1899, the British imports of cheese increased 34 per cent., whereas the Canadian exports increased 143 per cent. That indicates something of what may be gained by systematic, competent and authoritative direction, because the Government did not give any bonus assistance.

The development of the export trade in butter has been rapid and marked since cold storage was provided for the safe carriage of butter on ocean steamships. The increase in the value of the exports is shown in the following table:

Butter exported:

Year.	Value.	Year.	Value.
1895.....	$ 697,476	1898.....	$2,046,686
1896.....	1,052,089	1899.....	3,700,873
1897.....	2,089,173	1900.....	5,122,556

In passing, let me say also that the increase in the whole Dominion during that perid, between 1891 and 1899, in the number of creameries and cheese factories has been

from 1,733 in 1891 to 3,649 in 1899. The increase in the various Provinces has been as follows :

——	1891	1899	——
Maritime Provinces	28	177	Cheese factories and creameries.
Ontario	938	1,469	" "
Quebec	728	1,596	" "
Quebec (combined butter and cheese	....	307	" "
Manitoba	31	64	" "
Northwest Territories	7	32	" "
British Columbia	1	4	" "

The bacon trade, which also is a branch of dairy farming, has been developed very greatly in recent years. The growth of the export trade in bacon is shown by the following table :

Bacon, hams and pork exported,—

1896	1897	1898	1899	1900
$4,446,884	$5,871,988	$8,092,930	$10,473,211	$12,803,034

Canadian hogs are fed, as a rule, in a cleanly way. They are fed on feeds suited for the production of what are known as fleshy sides. Bacon with an excess of fat is not wanted except in the lumber camps. Consequently the farmers of Canada have been going into the breeding and rearing of a class of swine suited for the production of bacon having plenty of lean and firm flesh. The great extension of the dairy business of Canada has fitted in with the rearing of large numbers of swine. Skim-milk and whey are feeds suited for the feeding of swine. Experimental work has shown that swine fattened with part of a ration of skim-milk, were lustier, more vigorous and of a more healthy appearance than swine fatted wholly on a ration of grain. Whey is also a valuable feed for swine. There are about seven pounds of solids in every hundred pounds, and that quantity of whey fed properly in combination with other feeds, has produced two pounds of increase in the live-weight of swine. The feeding of meals from a mixture of cereals, such as oats, barley, peas, rye, and Indian corn, has resulted in a fine quality of swine products at the least cost per pound of production.

The export commerce of the country in most of the farm products is increasing at a very rapid rate. The following comparative statement of the value of the exports of some of the farm products of Canada during the years 1896 to 1900, shows the growth in that short period, and indicates something of the great possibility for further expansion of this trade :

Value of Some Canadian Farm Products Exported in Years 1896, 1897, 1898, 1899 and 1900. Years Ending June 30)

——	1896	1897	1898	1899	1900
	$	$	$	$	$
Wheat	5,771,521	5,544,197	17,313,916	7,784,487	11,995,48
Flour	718,433	1,540,851	5,425,760	3,105,288	2,791,85
Oats	273,861	1,655,130	3,041,578	3,268,388	2,143,79
Oatmeal	364,655	462,949	554,757	396,568	474,91
Pease	1,299,491	2,352,891	1,813,792	1,955,598	2,145,71
Cattle	7,082,542	7,159,388	8,723,292	8,522,835	9,080,76
Cheese	13,956,571	14,676,239	17,572,763	16,776,765	19,856,24
Butter	1,052,089	2,089,173	2,046,686	3,700,873	5,122,56
Pork, bacon and hams	4,446,884	5,871,988	8,092,930	10,473,211	12,803,34
Eggs	807,086	978,479	1,255,304	1,267,063	1,457,02
Totals	$35,773,133	$42,331,285	$65,840,778	$57,251,076	$67,871,206

Crops for Feeding Cattle. Besides these matters connected with the management of the soil and plants, great progress has also been made by dairy farmers in choosing the sorts of crops and the areas of each to be planted. It is now generally recognized that crops for dairy cattle must not only be nutritious but succulent also. The growth and feeding of turnips to horned cattle has been contemporaneous with their improvement in nearly all countries; and turnips appear to supply the form of succulent feed during the winter months which brings about the best development of constitutional vigor. The feeding of turnips to milch cows during their dry periods is advantageous in every sense. However, I do not wish to be understood at all as advocating the feeding of turnips to milking cows when succulent feed of quite as economical and more suitable nature, such as mangels, carrots, Indian corn ensilage and others, can be obtained. For milking cows in stables the following may be taken as a sort of standard ration for economy and efficiency. Of course it would have to be modified according to local conditions of soil, climate, cattle, and products wanted by each individual farmer. I put it forward more as being suggestive than as being one to be copied into everybody's practice.

50 pounds Indian corn ensilage;
50 " mangels or carrots;
5 " hay;
5 " oat straw;

and from 3 to 9 pounds of meal or other form of concentrated feed, according to the capacity of the individual cow and stage of lactation. It does not often pay to feed a milking cow a heavy ration of grain after the seventh month of her milking period. As a rule, that part of the ration may with advantage be greatly reduced from that period onwards.

Care and Breeding Some of the more important points to be observed in the care of dairy cattle are those concerned with the housing of the cattle in a country like Canada where the climatic conditions require the stabling of cattle on an average for perhaps six months of the year. It is a good plan to have the inside of the cow stable whitewashed twice every year. That, besides being a cleansing process, makes the interior of the stable lighter; and plenty of sunlight is a great promoter of health. The stable conditions throughout should make for the comfort of the animals. Comfort is a necessary experience on the part of the cow if she is to yield the largest possible profit. I have no occasion to go into this matter at length, as it is being treated of at this Convention more fully by others. In passing, let me remark that in the breeding of dairy cattle, the object should be continuously towards the development of the form and temperament which the dairy farmer considers to be most suitable for his dairy business. I do not hold that it is necessary to stick to one breed; but the crossing of breeds of different types of body and different types of temperament is seldom profitable, and is usually carried out at a loss—a loss of the best qualities of both of the breeds. Progress is made in the productive ability for either beef or dairy products only when the breeding is carried on in a direction towards a definite type for a definite purpose.

Milk, Butter, and Cheese. Great progress is being made in the methods by which dairy products are taken care of. It does not follow that they are now taken care of in such a way as to be always in better condition than formerly. But if no better care were taken of the milk and the butter and of the cheese nowadays, than was general twenty-five years ago, all of them would be very much injured indeed. Conditions of atmosphere, and all the rest of it, are very much less suitable for preservation than formerly. I have already hinted at the greatly increased forms of bacterial life which attack dairy products at all times and in all places. When ordinary cleanliness has been observed in the care of milk, it is still necessary that it should be kept continuously under 70 degrees if the best results are to be obtained from it in the making of butter and the making of cheese.

The ripening of cream for butter-making is now recognized as being almost wholly a process of fermentation. To obtain fermentation of the right sort many butter-makers pasteurize the cream, and then put in what is called a "fermentation starter." The fermentation which is beneficial to cream for butter-making becomes deleterious to butter if allowed to be continued when the product has reached that stage. Consequently, after the butter is made, unless to be consumed immediately, what is really needed is some form of "fermentation stopper" to put an end to the action of the fermentation starter. In saying this, I do not advocate the use of any preservative or other nostrum for the preservation

of butter. If the butter be put in a cold room with the temperature under 36 degrees Fahr., fermentation will be practically stopped. If butter is to be kept for a considerable period of time, it should be kept in a room at a temperature near 20 degrees Fahr.

The provision of cold storage at creameries, on railways and on ocean steamships has been one of the means for very great improvement and development of the creamery business. Occasionally the paper linings of butter packages have been found affected by spots of mould. When that occurs it is most objectionable, and lessens the value of butter. When such paper linings have been soaked for twenty-four hours in a strong solution of salt, to which about one ounce of formalin has been added, to three gallons of brine, the appearance of the mould on these butter linings has been entirely prevented.

Improvement of Curing rooms for Cheese. The curing-room should be so constructed and managed to permit the temperature to be maintained in it continuously at about 65 degrees.

Flavor and body are the two qualities which determine the relative market price of cheese. The character of these qualities in Cheddar cheese is largely determined by the process of curing. There is still some doubt as to what is the agent which causes the curing of cheese, and thus makes the curd partly soluble and the body of the cheese rich and plastic. While the nature of the agent or agents is still a matter of speculation rather than of exact knowledge, the conditions under which the curing can be carried on successfully are fairly well understood. So far as curing develops the flavor of cheese some of the agents in that change are probably minute forms of life known under the name of bacteria. The temperature at which the cheeses are kept affects the action of those minute forms of life, and of the unorganized ferments which may be in the milk itself or may have been put in with the rennet. Those determine in a large measure the flavor, the body, and the texture which are produced in the cheese.

Curing Affects Quality. A fairly steady temperature between 60 and 65 degrees Fahrenheit, gives the best results. At that temperature loss in weight by the shrinkage of the cheese, is also considerably less than at higher points. A dry atmosphere causes the cheese to lose in weight by the evaporation of the moisture, and may also cause small checks or cracks on the surface, particularly when the cheese are new. The curing rooms at the cheese factories in Canada are generally faulty in construction; and it is very difficult, if not wholly impracticable, to regulate the temperature in them at 65 degrees or thereabouts. Irregularity of temperature causes many of the faults which are complained of by the cheese exporters and also by the receivers of cheese in Great Britain. If the temperature goes down to or below 50 degrees, the cheese buyers complain of bitterness in the flavor. If the temperature goes as high as 70 degrees or over, the cheese buyers complain of a heated flavor, or worse still, of a condition which is called "off flavoured."

Wrong Methods The methods of managing the curing-room have been too much after the following fashion:

(1.) In the spring of the year a stove is used to heat the room; too often it is not screened or placed in such a way as to cause a circulation of air; the cheese in the vicinity of the stove are overheated, and those in the other parts of the room are left too cold.

(2.) In the warm weather of summer, the cheesemaker opens the windows and sometimes the door of the curing room at night, and shuts them in the morning. The average curing room is so conditioned by the genius of the builder and the frolics of time, that the closing of the doors and the shutters over the windows during the day time does not require all the pure fresh air to remain outside. It leaves the cheese to be cured in the dark continuously, and that is not wholesome.

(3.) In the cool weather of autumn, a stove is generally used in the curing-room, without any provision being made for causing the heated air to circulate evenly through every part of the room. Consequently the cheeses on the shelves near the stove are often kept at a temperature of 80 degrees, while the cheeses in the parts remote from the stove perhaps are at a temperature of 50 degrees.

Improvement by Insulation. The curing-room should be an insulated room, so constructed that the outside temperature would not necessarily affect its contents. For this purpose insulation means the construction of the walls, floor and ceiling of the room

in such a way that heat will not go through them readily. For the storage of butter the walls of the room should be so insulated that the temperature inside will not be more than 34 degrees, even when it is as high as 98 degrees in the open air. It is not necessary that the insulation of a cheese curing-room should be so thorough ; but it should be sufficient to permit the temperature to be kept at or under 65 degrees..

For the improvement of an old curing-room of the ordinary open construction, the following method may be adopted with good results. The whole inside should be thoroughly cleansed by a liberal use of boiling water. It should be disinfected by washing with hot water to which one pound of carbolic acid to ten pounds of water has been added. It should then be white-washed with fresh-slaked lime. To make the old floor close it will usually be necessary to put two thicknesses of building paper over it, and a new floor closely laid on top of the paper. If the inside walls of the old curing-room are of lumber or plaster, two thicknesses of building paper may be put on, and over them one thickness of matched lumber, dressed on at least one side. The ceiling should be made close in a similar way. The windows should be made close, and double doors and windows should be put on for use in summer as well as during the late autumn and winter. A coating of white-wash should be applied to the walls.

These improvements in a curing-room 30 feet by 20 feet would cost probably $220 for material and labor, according to the condition of the room and the price of lumber, labour, etc , in the locality ; $50 for double doors, windows and ventilator, and $80 for sub-earth duct. At a factory turning out about 300 large cheeses per month such a curing room might be so used as to avoid some of the shrinkage in weight which would occur in an ordinary curing-room where the thermometer fluctuated between 70 and 90 degrees. The saving might be one pound per cheese. The injury to the flavor and body of the cheese from over-heating and chilling might also in a great measure be prevented. The extra value which might be realized out of the cheese from the diminished shrinkage and superior quality would likely be not less than $450 during the season. Besides, great and lasting benefit would result to the cheese trade, if all the cheeses of Canada were cured in a proper way. The demand from the consumers in Great Britain would be increased, and the risk of loss to the merchants would be decreased.

Ventilation and Moisture. In a room of which the walls are close, and otherwise well constructed, the curing of the cheese will raise the temperature. Each cheese by the fermentation going on during its curing, acts somewhat like a small slow-burning stove. There must be some means of cooling the room.

The average cheese curing room is too dry. During hot weather the floor should be sprinkled with water once or twice a day, certainly every morning. The evaporation of the water cools and moistens the atmosphere to the improvement of the cheese.

A cheap and effective means of cooling, and at the same time, ventilating a curing-room, is to use a sub-earth air duct. The duct or drain may be brought in through the floor of the room in two places. It should be not less than 100 feet long, should be 4 feet deep, and have an opening for the passage of air of about 10 inches square for every 5,000 cubic feet of room. It should be made of tiles. A good method is to put rows of tiles parallel to each other, with two inches of earth between the rows in the same duct or drain.

An upright opening at the far end, with a hood to be turned to the wind, is an advantage. In summer, such a sub-earth air duct can be used to reduce the temperature in the curing-room from 10 to 15 degrees if the floors, walls, windows and doors are reasonably close.

Results of Investigations. The Dominion Department of Agriculture has conducted experiments with the cheese of one factory for the seasons of 1899 and 1900. The cheese, in the season of 1899 were divided after they left the press room, a portion being put into a curing room in which the temperature was kept continuously under 65 degrees Fahr., and a portion was put in an ordinary well constructed curing-room. In 1900 the cheese were divided into three lots, one lot being put in a curing-room whethere the temperature was kept continuously under 65 degrees, a second lot being put in an ordinary well constructed curing-room, and a third lot being put in a curing room similar to those in the most poorly equipped factories ; it was simply a loft over the cheese making-room.

The following is the report of a Committee of the Cheese and Butter Association at Montreal which was appointed for each of the two years to examine the cheese and report

on their quality. The three or four cheese as the case might be, from the controlled curing-room were placed right opposite to the corresponding three or four from the uncontrolled curing room. The cheese had been kept in these curing-rooms until they were from three to five weeks old, when they were shipped to a cold-storage warehouse. They were kept in it at a temperature of about 38 degrees Fahr. until they were examined :

"At a recent meeting of the Butter and Cheese Association, which was called at the request of the Commissioner of Agriculture and Dairying, we, the undersigned, were appointed a Committee to inspect several lots of cheese, half of which we were informed had been cured at a temperature of not exceeding 65 degrees, the remainder being cured in the ordinary curing-room. In company with the commissioner we inspected some thirty-one lots, and we found those cheese cured at a temperature of not exceeding 65 degrees were very much superior in quality to those cured in the ordinary way, the difference in quality in most instances being most marked. Those cured at the lower temperature were better bodied, more silky in texture, and much milder in flavor, besides retaining their moisture better than those cured in the ordinary way. As a merchantable article we consider those cured at the lower temperature are worth fully one-half cent per pound more in price than those cured in the ordinary way. In view, therefore, of the marked superiority in quality shown in those cheese that were cured at the lower temperature, we advise that the Government be urged to impress upon the cheese factories the desirability of seeing that their curing rooms are kept at a temperature of not exceeding 65 degrees Fahr., and that the factorymen should also be informed of the length of time required to cure cheese at the lower temperature. A detailed report is herewith annexed. Arthur Hodgson, President; Jno. McKergow, D. A. McPherson, Alfred J. Brice, P. W. McLagan."

That presents the substance of the whole question. The cheese cured under these conditions of controlled temperature, continuously under 65 degrees Fahr., are of better quality, better flavour and are worth a half a cent per pound more than the others cured in an ordinary curing-room in which the temperature was sometimes between 70 and 80 degrees Fahr."

Some Officials of the Department. During the past season, the Department of Agriculture had one man stationed at Montreal who was an official referee on the quality of cheese and butter. When a dispute arose between a salesman and a buyer regarding the quality of any lot of cheese or butter, the official referee might be called in to give his decision on the quality. He also wrote to the salesman or manufacturer pointing out what in his judgment would be a means of remedy in the case of any defects he had observed. This work was done during the past summer by Mr. J. A. Ruddick, and his services in that capacity have been eminently useful and satisfactory.

The Department also had one man stationed at Montreal during part of the season to observe the condition in which cheese and butter were handled in loading the steamships. Taking seven comparatively small lots of cheese as an instance from one of his reports, the following is a statement of their condition as delivered on the wharf :

Of 786 boxes of cheese, 101 were in a broken condition, but had been coopered, mostly by being tied with strings. 85 were broken and not coopered. That showed a total of 186 boxes in a partially damaged condition, or twenty-three per cent. of the whole lot.

Agents of the Department of Agriculture were stationed during the past season at the ports of London, Bristol, Liverpool, Manchester and Glasgow. They were instructed to report on the condition in which Canadian cargoes were delivered from the steamships, and to observe the manner in which they were handled from the steamships to the warehouses or to the railway cars. The reports which they furnished were submitted to the owners or agents of the steamships on the Canadian side, and have already led to very great improvement in the manner in which Canadian products are stowed in the steamships, and the manner in which they are handled both in the loading and discharging of the cargoes. However, these reports from our agents in Great Britain show that in many cases cheese were delivered from the steamships with as much as fifty per cent. of the boxes in a broken condition. Some of the reports say the boxes were too large for the cheese, that they had ill-fitting covers, that they were made of poor material particularly the bands of the boxes, that they were not well nailed, that they were not

clearly marked, that some were dirty, and that in not a few instances cheese were delivered in a heated condition. All these things call for improvement and for remedies.

Further Improvements. I am authorized by the Minister of Agriculture to intimate that if dairymen will take the necessary steps to protect the cheese in the curing-rooms at a temperature under 65 degrees Fahr., so as to turn out the best quality in flavour and body through proper curing, he will do his best to arrange with the railway companies to provide more suitable cars for the carriage of cheese to the seaboard, and also see that steamship companies provide forced ventilation of holds in which cheese and other perishable products are carried, by means of ventilators and fans. It is most important for the dairy business that immediate attention should be given to these matters. The matter of paying one or two cents more per box to obtain a strong, well made, well nailed, close fitting box, of good sound lumber is a small matter compared with the increased value which such a package would give to its contents in the British market.

There are many other matters which should also be mentioned in an address which has even such a title as "The Progress of Dairying in Canada," which time will not permit me even to allude to. But I am authorized by the Honorable the Minister of Agriculture to say that our Department is looking towards the extending of its usefulness in the directions where dairymen still need the most help. Men will again be sent to Great Britain to observe the conditions of the markets, to learn the latest preferences there, and to observe the methods of delivering food products from the steamships. Our office will also as far as possible interpret the commercial criticism of the buyers in Great Britain into helpful information for the producers in Canada.

We can only hope to keep our place in the markets and to make any gain, by the superiority of our products the regularity of their shipment, by having them put up in the nicest and most attractive form, and by ability to sell them as low as any of our competitors and still have a living profit for ourselves. These results can be obtained in proportion as the dairy farmers make further progress in intelligence, practical ability, and a desire and capacity to work together for the good of all. (Applause.)

THE STORY OF A COW CENSUS.

By Ex-Governor W. D. Hoard, Fort Atkinson, Wis.

There seems to be a strong tendency among dairymen to resist the influence of a knowledge of the truth concerning the real facts of their business. Every man among them is full of hope that somehow he is doing the best he can. I appreciate and admire a splendid hopefulness like that.

But, the outcome, what of that? How does the pocket-book look at the end of the year? Doesn't it look too often as if an elephant had stepped on it?

I have studied this business long enough, and the men and cows that are in it—myself and my cows included—to know that there is the biggest kind of a chance here for self deception. I find such a great host of dairy farmers who have never instituted any investigation as to the actual facts of their business. They keep no records; they get along with just as little figuring as possible. They are honest, hard-working, God-fearing men, but they will not keep books. They "guess" this, that, or the other way is right, and go ahead. As the editor of a dairy paper, I have been for years hunting for the real facts of this dairy business. You, who have read it, know that. At the expense of several hundred dollars, I had a thorough analysis and census taken in 1886 of every farm cow in the town [township] of Ellisburg, Jefferson Co., N.Y. This town was the leading dairy town in New York, and the cows numbered 5,507. The farmers owning these cows devoted their milk almost exclusively to cheese-making, and the amounts of their earnings were verified at the factory. There was great depression existing among these farmers. They were losing money, but they could not see how. I thought a thorough inventory, or census, of their year's work would help them see the true situation, and besides throw a

flood of light upon this question generally. Suffice it to say, the business was done thoroughly by Mr. C. W. Jennings. Three hundred and sixty-seven farms were visited, many of them three times. Time sufficient was taken to investigate, cross-investigate, and verify the actual facts concerning the earnings of those 5,507 cows, as they were being managed by these 367 farmers. The result showed that these cows brought the town in debt over $25,000 a year. That is, the food they consumed, reckoned at what it was worth in local markets, with pasturing at $5, would have sold for $25,000 more than these cows earned. The information derived from this census created a great stir among the Ellisburg farmers, and also all those who were fortunate enough to read the various letters from Mr. Jennings, detailing the facts in Hoard's Dairyman. Every farmer in that town got a sample copy of the paper, containing those letters. It created a revolution in their ideas of cow and farm management.

Many of the readers of Hoard's Dairyman, living in other portions of the country, wrote me that that census had proved a great eye-opener and educator to them. A great improvement has taken place in many of the herds of Ellisburg since that census. What was it that led those farmers into that loss of $25,000 a year? Lack of live mental interest and study in the principles of dairy farming. That was what did it. What stirred some of them up to improvement and larger profits? A knowledge of the facts and better study. Since that time, many of the herds of the town have increased their earnings per cow from 40 to 50 per cent. Some day farmers will learn that it pays a big profit to be intelligent in this business of handling cows.

Last year Hoard's Dairyman instituted the taking of two other censuses, each of 100 herds. The first in Iowa, the second in Jefferson County, Wisconsin.

I wish to lay before you some of the more significant facts brought out by these two careful and painstaking attempts to get at dairy truth as it applies to average dairymen and cows.

In both States the farmers whose year's business was investigated were patrons of creameries, and so we have the basis of actual record to proceed from.

The Iowa patrons differ somewhat from those in the Wisconsin census. The former are farmers who are, it is true, patrons of creameries, but they are not yet dairymen. But little more than half of them, if I remember correctly, are readers even of an agricultural paper, and not more than one in ten are readers of dairy literature.

On the contrary, Jefferson Co., where the Wisconsin census was taken, is one of the most prosperous dairy communities in the United States. About 1200 copies of Hoard's Dairyman are taken and read in that county. A comparison of results in the two sections will serve to show whether such literature tends to promote the larger profit and increased wealth of the dairy farmer, or not.

Four things will stand out as lessons to be learned from a study of these two cow censuses.

(1) The kind of man each farmer is and the amount of intelligence he puts into his business, and whether he takes any pains to make himself intelligent or not.

(2) The kind of cows best suited to the best profit in dairy work. Whether it pays best to breed dairy cows or dual purpose cows.

(3) The great difference in the earnings and net profit of different herds of cows right in the same neighborhood. Also the important fact of how much greater return some cows bring than others for every dollar's worth of feed consumed.

(4) The very important fact that it pays the largest kind of profit to be intelligent, and well posted in the art of breeding good dairy cows from dairy blood, as well as the art of intelligent feeding and handling the cow.

These lessons need to be kept before our eyes all the time, or we go off after strange gods.

Right to-day, in my county, with all the knowledge of the difference in the profits between poor or well bred dairy cows before them, there are farmers who are deliberately setting to work to lessen the productiveness of their future cows by putting at the head of their herds bulls from beef breeds. They can see only the half dollar gained in a larger male calf for beef purposes, while they lose sight of the dollar lost in the heifer for dairy purposes.

The Wisconsin Census.

I will now proceed to a consideration of the Wisconsin census. The number of farmers and herds investigated was one hundred. Number of cows 1,822. The average cost of food consumed per cow was $29.83. Average cash earnings per cow at the creameries, $45.89. Highest cash earnings per cow was $61.41 in herd No. 45, consisting of 15 high grade Jerseys. The next highest was herd No. 32, consisting of 35 grade Holsteins, with few full bloods, averaging $58 06 per cow. The next in point of earnings was herd No 80, consisting of 20 grade Guernseys with average earnings of $57.24 per cow.

The lowest cash earnings per cow was $28.53, herd No. 6, consisting of 13 native cows. Next, herd No. 64, twelve scrubs and a little Jersey blood. Earnings, $28.81. Next, herd No. 5, 15 grade Jerseys and scrubs. Earnings, $29.00. Next, herd No. 16, consisting of 16 grade Shorthorn and grade Holsteins. Earnings, $29.58. These were the only herds whose earnings went below $30.

Of the 100 herds there were eleven whose earnings per cow ranged from $30 to $35. Seventeen ranged from $35 to $40. Twenty-two herds ranged from $40 per cow to $45. Twenty-five ranged from $45 to $50. Twelve herds ranged from $50 to $55. Eight herds ranged from $55 to $60. One herd only went above $60. The average pounds of milk per cow yielded by these 100 herds was 4,740. The average yield of butter per cow, 251 pounds. The average cost for keeping per cow, $29.83. The average cash earnings per cow was $45.89, at the creamery.

We now come to a very important and somewhat new feature for consideration,—that of the earnings of each herd for every dollar's worth of food expended. Four herds ranged from $2 02 to $2 08 for every dollar's worth of food consumed.

This was certainly a safe investment, being over 100 per cent. and highly remunerative if a man had enough invested. Of these, the highest, $2 08, consisted of 16 grade Jerseys. The cost of keeping was reduced to $26. Returns from the creamery per cow, $54 16. Pounds of milk per cow, 4,920; pounds of butter, 286; average price received for butter, 18.9c.; average price received for milk per 100 lbs., $1.10

The next highest was $2 07 for each dollar's worth of feed. This herd consisted of 15 grade Jerseys. Cost of keep per cow, $30. Earnings per cow at creamery, $61.41. Pounds of milk per cow, 6,501; pounds of butter per cow, 322; price received for butter, 19.1c.; average price received for milk, 94.5c.

The third highest in this category was a herd of 20 grade Guernseys. They gave $2 04 for every dollar's worth of food consumed. Cost of keep per cow, $28. Earnings per cow at creamery, $57 24; pounds of milk per cow, 5,777; pounds of butter, 301; price received for butter, 19c.; price received for milk, 97.1c. per 100 pounds.

The fourth of these herds consisted of 20 grade Jerseys. Cost of keep, $29. Return for each dollar's worth of food consumed, $2 02. Earnings per cow at creamery, $58.83; pounds of milk per cow, 6,552; pounds of butter per cow, 331.3. Price received for butter, 18 cents; price received for milk, 89 8 cents.

You will note that there is considerable variation in the price received for butter and milk. This will occur among patrons in the same creamery where the butter sells even for a uniform price. Those who received the highest price for butter and milk produced their milk in the fall and winter mainly, at a time of year when the price for butter is the highest. Another argument for winter dairying.

You will also note that in the herd that gave $2 08 for every dollar's worth of food consumed, the cost of keeping was reduced to $26. This herd reached the highest economic return in cost of production, though their butter product was 46 lbs. less than the next herd. This teaches us the valuable lesson that the real thing for us to do is to look about us and reduce the cost of production all we can. The owner of this herd had a silo; he fed a balanced ration, and he sold one product of the farm to buy protein food to make a balanced ration. He used his brains, and it paid, did it not? His cows were not as productive, either in milk or butter, as one other herd, but he got the most per 100 lbs. for his milk. The cows tested high and the cost of food was low.

The highest cost of keep per cow was $38. This was with a herd of 34 grade Holsteins. The returns from this herd show earning per cow, $52 5 9; pounds of milk

per cow, 6,242; pounds of butter per cow, 280.5; price of butter 18.7 cents; price per hundred of milk, 84 2 cents. Return for every dollar expended in food, $1.50.

Now for instructive contrast, let us look at two herds which returned one 96 cents and the other 97 cents for every dollar's worth of food consumed. The first consisted of low grade Jerseys and scrubs, all badly bred and poorly handled. The cost of keep per cow was $30; returns from creamery, $29; yield of milk, 3,371 pounds per cow; yield of butter, 152 pounds. Price butter sold for, 19 cents; price per hundred of milk, 86 cents.

We can see from the above facts that it requires more than 150 pounds of butter per cow at a good price to pay for the keep of that cow where cost of food is $30 a year.

The second herd consisted of 12 scrubs, also mixed with a little Jersey blood. The cost of keep, like the other, was $30; earnings per cow at creamery, $28.81; yield of milk per cow, 3,583 pounds; yield of butter, 151 pounds. Price of milk, 80.4 cents per 100 pounds.

Here was a plain case of ignorance and indifference to sound knowledge. No man possessed of a particle of dairy sense, would produce such animals and call them dairy cows, or undertake to do a dairy business with them. But these two men did. They were actually so stupid that they did not dream that any of the patrons about them were doing any better than they. They had never read nor studied anything to obtain a judgment of what a good cow was, or should do. Like thousands of men in this country who keep cows, they had no use for dairy literature, nor anything, in fact, but a poor cow and a losing dollar.

There were quite a number of the patrons who barely got through by the skin of their cow's teeth, some of them running as low as $1.06, $1.07, $1.15, $1.16, $1.21, and so on, for every dollar spent in food. Twenty herds ranged from $1.70 to $1.88 for each dollar spent in food. Of these, 7 were grade Jerseys; 4 were grade Guernseys; 3 were grade Holsteins; 1 was native; 4 were grades of mixed breeds; 1 was Guernsey and Shorthorn grades.

Twenty-four herds ranged from $1.31 to $1.70 for each dollar spent in food. Of these 3 were grade Jerseys; 8 were grade Guernseys; 7 were grade Holsteins; 1 was a native herd; 4 were mixed grades of all dairy breeds; 1 was Guernsey and Shorthorn grades.

Thirty-five herds returned from $1.25 to $1.50 for each dollar spent in feed. Of these 1 was Brown Swiss grades; 2 were Shorthorn grades; 7 were a mixture of all dairy breeds; 4 were natives; 3 were Holstein grades; 5 were grade Guernseys, and 11 were grade Jerseys.

Fifteen herds returned from $1.07 to $1.25 for each dollar in feed. Of these 3 were grade Jerseys; 3 were grade Holsteins; 4 natives; 3 of mixed dairy breeds; and 2 were Shorthorn grades

You will note that as you go down in the scale of return for each dollar's worth of feed, the number of natives and dual purpose cows increase in number.

Right here in the society of these poor cows, we find the man who "knows it all," who has no use for book farming, and who evidently likes his job, because neither men nor angels can get him to forsake it.

Nearly all of these poor cows, as far as we can learn, were bred from grade sires. A grade bull is an open bid for poor cows, usually struck off to the man who "can't be fooled" into improving either his mind or his cattle. Such men are found abundantly in all the dairy districts of the land. The great concourse of poor cows that flood the land were of their breeding and raising.

Please remember that these things are true in Jefferson County, Wis., where more dairy literature is read than in any other county in the United States. A county, as I said before, in which something like 1,200 copies of Hoard's Dairyman are taken and read. Such men are found in the same creamery, neighbors to men whose returns are 40 to 75 per cent. greater.

It shows how ignorant men can live in the full blaze of light and intelligence and not know it. You may well ask: If these conditions can exist to such a proportion in the most intelligent communities, what must be the condition in other communities where they read and think less on this question?

The Iowa Census.

Mr. Frank Kinsley, in the employ of Hoard's Dairyman, visited one hundred patrons of creameries in Iowa, and by close study and investigation arrived at a basis of calculation as to the dairy intelligence of the men who owned the cows, the efficiency of the cows themselves, how they were bred and fed, the yearly cost of the food. the amount of milk and butter per cow in pounds, and cash value thereof. The pounds of milk, butter, and cash value of the same were derived from the books of the creamery. The census was published in the Dairyman in various letters from Mr. Kinsley the past year, and a complete table computed and printed in the issue of Nov. 30, 1900.

When a man keeps a herd of cows, milks them, feeds and houses them, and sends the milk to a creamery, I class him as a dairyman, one who is subjecting himself to general dairy expense. The question then is whether the cattle he keeps are the best for that sort of work.

There was a wide range in the character of the cows. The total number in these 100 herds was 982. There were four herds that returned from $2.11 to $2.30 for every dollar's worth of food consumed. There were 58 out of the 100 herds, whose cows averaged above one dollar for every dollar's worth of food consumed. The highest being $1.91, the lowest being $1 00 Of these, 13 herds returned from $1.50 to $1.91 ; 20 herds returned from $1 20 to $1.50 ; 24 herds returned from $1.00 to $1.20.

Now we come to the side of absolute loss,—38 of these Iowa herds returned less than one dollar for every dollar expended in feed. This loss ranged from two cents to sixty-six cents per cow. Think of it, in these days of prosperity, dairy information and progress, a man keeping cows, taking milk to the creamery, and losing 66 cents for every dollar expended for food, thinking he was doing a dairy business. The only solace he could have was that his herd was small, only three cows.

Every one of these herds which brought absolute loss was a dual purpose, or native herd. Mr. Kinsley classified the herds as "Dual Purpose," "High Grade Shorthorns," "Natives," "Grade Shorthorn," "Grade Dairy," "High Grade Dairy," etc. Fifteen herds were classified as "Dairy Type," "Grade Dairy," "High Grade Dairy," and "Grade Jerseys." These herds returned from $1.43 to $2.30 for each dollar's worth of food consumed. I want to call the attention of all thinkers on dairy questions to the value of this table. That, and the one concerning the results from 100 herds in Jefferson Co., Wis., in the issue of Hoard's Dairyman of August 10, 1900, are of great service in demonstrating the truth of several propositions, which I enumerate as follows:

(1) The effect of dairy intelligence, or a lack of it, in a farmer, as seen in his profits. There are so many farmers who keep cows, and who do not think it pays to know any more than they now do, that it is well to have a clear authoritative record on that matter. It is well to get the ignorant and well posted together, and see, by contrast, which make the most.

(2) This table illustrates very well whether general purpose or dairy bred cows are the most profitable to keep in a dairy.

(3) Here is found a very good demonstration of the practical truth of advanced theories on feeding dairy animals. Only five out of the 100 herds were fed any protein feeds bought in the market, and curiously enough they are among those which gave the highest returns. There were but two or three men who fed a well balanced ration. One man, No. 39, fed a ration of gluten feed bran and ensilage in a well balanced form and to high grade dairy cows. Now note the result to this man. His cows gave a return of $2.30 for each dollar in feed, and he made a net profit of $33.85 per cow. No. 18 fed bran and clover hay to a herd of full blood dairy cows and got 325 lbs. of butter per cow.

A word more as to the general, or dual, purpose question. How many steer calves, considering that one half only are males, would it take, do you suppose, to make up to the 38 men who fed at a loss, for their loss, and the profit No. 39 got of $33.85 per cow. In other words, as long as these men are putting themselves to the expense of keeping cows, feeding them, housing and milking them, and carrying the milk to the factory, would it not pay them a great deal better to employ cows that would answer back with a good return at the pail?

To illustrate: Take No. 51, a full blood dairy herd, and compare results with No. 50, a dual purpose herd. The dairy herd gave 5,966 lbs. of milk per cow. The dual purpose, 6,250 lbs. of milk. The milk of the dairy herd made 334 lbs. of butter, which brought $63 46. The milk of the dual purpose herd was 284 pounds more than the other, and made 250 lbs. butter, 84 lbs. less, which brought $47.50, or $15.96 less per cow than the dairy herd.

But that is not all. The dual purpose herd cost $34 per cow for keep, while the full blood dairy herd cost $30 per cow.

Take Nos. 39 and 40: No. 39 a high grade dairy, giving 5300 lbs. of milk per cow. No. 40 was a dual purpose herd, giving 5,090 lbs. of milk per cow. The milk of the dairy herd, 210 lbs. the most, produced 315 lbs. of butter, which sold for $59.85. The milk of the dual purpose herd, only 210 lbs. less, produced 203 lbs. butter, or 115 lbs. less, which sold for $38.57, or $21.28 less cash per cow. As to cost of keep, the dual purpose herd was $7 per cow the most.

Take Nos. 37 and 38. No. 37 is a high grade dairy herd, giving 4,933 lbs. of milk per cow, which made 275 lbs. of butter, which sold for $52.25. The dual purpose herd, No. 38, gave 4,570 lbs of milk, or 363 lbs. less per cow, than the dairy herd. From this milk was made 188 lbs. of butter, which sold for $35.72, or $16.53 less per cow than the dairy herd. In the case of these two herds, the cost of keep of the dual purpose herd was $25; the dairy herd, $30.

And so comparisons of like character may be found in abundance all through this history of 100 herds. Iowa is where general purpose cows and general purpose dairying may be seen in all its glory. The wastefulness of such animals with but few exceptions, for dairy work, is clear to be seen. There are thousands of men in Canada and the United States who are deluding themselves in like manner, throwing away ten dollars' worth of milk and trying to make it up with five dollars' worth of steer, and yet all the time incurring the same expense to keep and handle the dual purpose cows that they would the dairy cows.

Facts of this character multiply; the lessons to be drawn from them are becoming more and more apparent. The live, practical question then is: Are we intelligent enough to see these facts and dispose of them to our best profit?

R. G. Leggett, Elgin: My herd of ten Holstein grades have averaged 6,869 pounds of milk from each cow from the 10th of April to the 10th of January. (Applause.) I have grown all their feed except a little bran.

Ex-Governor Hoard: That is good: but there are a lot of Canadians who do not reach that. (Laughter.)

BACTERIOLOGY IN ITS RELATIONSHIP TO CLEANLINESS IN BUTTER AND CHEESE MAKING

By Dr. W. T. Connell, Prof. of Pathology, Queen's University, Kingston.

Before we can enter upon a discussion of this subject it will be necessary for us to know something of the nature of bacteria, with their distribution and functions in nature. One cannot in the limits assigned for this paper, do more than shortly refer to a few of the most important points in the life history of these microscopic plants, so as to bring out their salient characters. I have before previous meetings of this association, several times shortly discussed this subject, but I may perhaps be excused for repeating myself before this audience.

Bacteria are microscopic plants, in fact the smallest forms of organized life yet known. These plants while exceedingly minute in size yet carry on, on a small scale, many of the processes of life as seen in our higher plants. They require for life and growth, suitable food material or soil, moisture and a favorable temperature, as do all plants. Under circumstances which furnish such suitable conditions for growth, bacteria multiply with marvellous rapidity and in this way make up much for their diminutiveness in size. There are many very different species of bacteria—in fact hundreds have been described.

Now all these species have some function in nature, and play a part good or evil as the case may be in many processes which we look upon as quite natural. Among the many functions or activities of bacteria we have putrefaction and decompositions of all kinds, many fermentations, many important changes in the soil, and finally many diseases in man and animals. Naturally being active in so many different processes we are not then surprised at the statement that bacteria are found practically everywhere.

While this statement is true it must not be supposed that all species are found so widely distributed, for it is not so, as these microscopic plants follow the same rules as govern the life of the higher plants. They grow and develop from previous germs, only on food most suited to them, and consequently will be found most numerous where the food is most abundant, and where the other conditions are favorable to their development. Thus the diphtheria bacterium is found in the throats of those suffering from the disease and may be transmitted to the throats of others in various ways. It does not develop of itself, but has come either directly or indirectly from some previous case. So with other species each has its own life history. By their life and growth some species, as I have before stated, are agents of decay—others are the active fermenting agents and the changes, which are described under these two headings alone are very numerous.

Now it is found when one studies milk and its products, butter and cheese, that certain species of bacteria find in them what we might call a natural habitation or seat of growth, and are practically constantly found therein. In fact they must be present before we can have the necessary change set up to make butter and cheese a finished product.

These are the agents which induce what I have come to term the normal or natural fermentations in milk, butter and cheese. These changes are those of souring and curdling in milk-acid formation in cheese making and ripening of the cream in butter making. All these changes are due to one set of bacteria which are known as the lactic acid bacilli.

These bacilli must be present before we can have acidity develop in the process of cheese-making—or ripening of the cream in butter-making. Hence it is that willy-nilly the maker has to have this bacterial starter before he can manufacture his cheese or butter. I mean by this that the maker has to have in his milk or cream these bacteria to act as starters. He may depend on them being in the milk when brought to him at the factory as they usually are in greater or smaller numbers—or he may add what is termed a "starter" which is simply milk, whey, or buttermilk containing a large number of these bacteria The difference is that if no "starter" be employed then the maker hopes he has got the bacteria present in such numbers as will control his fermentations for him. If he adds a pure "starter" he knows he has got the proper agents to initiate his normal fermentations and control most abnormal ones. One can readily see that "starters" to be used must be pure and clean, for if they are not so, they cannot initiate the proper fermentations, but will set up abnormal ones and make a bad article of butter or cheese.

As milk is such a good foodstuff, containing as it does all the elements of food, milk and its products are very subject to fermentations and putrefactive changes due to entrance of species, not usually found therein which on such a material can grow and develop. The entrance of such species will induce abnormal changes in the milk and in cheese or butter. In fact nearly all abnormal conditions not directly dependent upon diseases of the animal or upon the food used, and not directly the fault of mismanagement of the milk during its manufacture, can be ascribed to the growth of these foreign species of bacteria.

How do these bacterial species get into the milk?

This question can be answered almost at once by saying that they obtain entry in the majority of cases by faulty and filthy handling of the milk at some stage of the process, from the time it lies in the udder of the cow till it is manufactured. To faulty and filthy surroundings also must be ascribed their due share in the causation of these troubles. Such being the case, as I will try to prove later on, we can see at once the relationship of bacteriology to cleanliness in milk manufacture. For we can by cleanliness and by avoidance of these faulty and filthy conditions do away with the bacteria causing abnormal fermentations. For filth is dangerous mainly because it contains dangerous bacteria. I mean dangerous in so far as it contains bacteria inimical to the production of good butter and cheese. But some may say is there no danger by excessive cleanliness of excluding even those forms which are requisite, as bringing about the desired fermentations. We need have no fear of extirpating these forms. They are found in vast

numbers in the neighborhood of their food. Indeed many have found them just inside the teats themselves, and consequently they would be washed out in the first streams of milk. I have never examined a sample of milk yet where these germs were entirely absent, though I have not examined many samples just after milking. We should not, then, fear the exclusion of the desirable bacterial forms, but should take steps by cleanliness to exclude the undesirable species.

What are the common sources from which the undesirable bacterial forms are derived? Nearly all are in the milk when it is brought to the factory to be manufactured into butter or cheese. In other words the milk is seeded at the farm. One of the commonest sources of seeding is the entrance of manure particles either from udder or sides of cow, or from milker's hands during milking. Every maker knows that in the milk brought to him such particles are not infrequently found. Given a favorable temperature, the bacteria which are in such particles will rapidly increase in numbers and taint the milk. If any of you are skeptical just take a pint of milk, heat it to about 170F. for about five minutes so as to kill all other ferments in milk, and then after cooling introduce a pea-sized particle of manure, break it up, and then set aside in a warm place for twenty-four hours, and note the result. I fancy you will be less skeptical of the results of such material in influencing the products manufactured from milk containing it.

Another fairly common source of bacterial tainting is the entrance of dust from dirty yards, pig pens or stables, or from the road. Such dust is always laden with manure particles, or with particles from other putrefying matter, such as decaying roots or straw or even from decaying grain.

The character of the changes effected in the milk or cheese by the entrance and growth of bacteria in the ways already described differ considerably in different cases. The growth of the lactic acid and bacteria has a very powerful influence over the growth of the other species. In the vast majority of instances this influence is to control or even prevent further growth of the other species. As a rule we can say that the growth and development of the lactic acid bacteria has a deterring effect on the development of other species. Right here we see the benefits of a good lactic starter when the milk is not quite what it should be and yet has been accepted. We cannot make excellent cheese out of milk, but by the use of starter we can make better cheese than we otherwise could.

As an illustration of the effects the lactic acid bacteria have upon the growth of other species I cannot do better than speak of the results of some experiments performed with Mr. Ruddick at Kingston under the Commissioner of Agriculture and Dairying. From a very rancid cheese sent me from Montreal by Mr. Ruddick I separated out a bacillus belonging to a class of bacteria constantly found in manure and such like material, and we attempted to reproduce this condition by introducing this bacillus into milk and making cheese therefrom.

About one-half per cent. of a starter of this bacillus plus 1 per cent. of a pure lactic starter were added to milk, and this was then made as skilfully as possible into cheese. The curd floated, but the gas was worked out very well, and the result was a marked "off" flavored cheese with a flavor suggestive of decaying roots.

On the next day a starter made directly from the cheese was added to the milk in about one per cent. volume. Here the curd did not float, but the cheese is decidedly worse than the first day's make, though of the same character. In the cheese starter there was only a slight acid development, and the result was a worse cheese.

Some days later a cheese was made by adding a starter of about one per cent. of the rancid cheese bacillus alone. This curd while gassy did not float, but the cheese is typically rancid, in fact very much the same as the rancid cheese from which I had separated the bacillus some weeks before.

Now here are three cheese all containing the rancid cheese bacillus, yet the quality of the cheese produced has been so controlled by the lactic acid bacteria present as to make those cheese better which contained these bacteria in largest numbers during making.

But the main point here is the fact that such cheese can be produced by the presence of this bacillus, and when we look to the sources of this bacterium we find it has its usual habitation in such material as manure and like decaying matters, and such being the case cleanliness in milking, cleanliness of the can and of the milk shed would exclude this bacterium from the milk at the farm at least.

But there is yet a source of trouble—a source that is often threshed out at dairy meetings—that is from improperly cleansed milk cans and utensils, particularly where foul whey has been returned in the milk cans. There is no necessity of a factory making its presence known through the nose almost before it can be seen by the eyes, as so many of our factories do, and while the drain is most often at fault it is too frequently aided by the foul whey tank. A factory can be drained without any odor at comparatively small cost on the septic tank system. Put such foul whey into milk cans, and it will take pretty vigorous scrubbing to rid the cans of the taint. You may be sure if the cans are not properly cleansed so as to destroy them, the same bacteria that are bringing about the changes in the whey will begin to effect the same changes in the milk. If the whey is clean and fresh there is not this danger at all—though my opinion is strongly against whey in any form being returned in the milk cans. It only lays open another possible channel of infection and adds to the dangers if care is not taken to keep the cans very clean. Most of you know that cleanliness is only comparative. One hotel keeper thinks his beds are clean if the sheets are changed once a month, another requires them to be changed daily. So it is I am afraid with the handling and care of milk—what one would consider careful handling, or at least all the handling that was necessary, another might and would consider quite the opposite.

But we cannot say than in all cases the blame rests on the broad back of farmers. Particularly not when the factory and its surroundings are not kept thoroughly clean. By the blowing in of dust from a drying filthy pool or drain, or by the carriage of like material by the agency of flies or insects, we may have the milk seeded with bacteria that are altogether undesirable I can but call your attention to a bulletin on "Discoloration of Cheese," published by the Dominion Department of Agriculture, or to my article in the reports of the Association for 1899, to give you illustrations of conditions which led to taints in cheese owing to the entrance of bacteria from filthy surroundings of the factory.

This last summer the cheese from a number of districts have shown a peculiar "fruity" flavor. It seems probable that we may be able to trace this flavor to the activity of a foreign bacterium. Experiments are now under way which will probably settle this question, and we hope to know the results in a few weeks.

I could illustrate by many examples the fact that most all taints apart from food taints and those due to odors are due to the entrance of species of foreign bacteria which it is within our power by careful attention to cleanliness in the care and handling of milk, to exclude. Again I say, we have to learn the lesson in handling milk that dirt is dangerous, not only because it itself soils, but because of the character of the minute forms of life which it supports—and which so often find in milk a suitable soil in which to develop.

We must by strict cleanliness prevent the entrance of material containing bacteria, and by this means prevent abnormal fermentations. Water is very cheap in this country —the more plentiful use of it is called for Again let me say that good hot water and steam are the very best agents to kill bacteria that we possess, far surpassing in worth all other disinfectants. A plentiful use of these secures clean utensils and clean factories.

A little attention to the ordinary principles of cleanliness secures clean milking and clean milk, and hence a freedom from bacteria causing many taints It is well to remember that the text "Cleanliness is next to Godliness" is not only applicable to our own persons, but to our dairy work.

DAIRYING IN NEW ZEALAND.

Mr. J. A. Ruddick, formerly Superintendent of Dairying in New Zealand, gave an interesting description of the condition of the cheese and butter business in that colony. This address appears in the report of the proceedings of the Western Dairymen's Association.

EDUCATION.

By Ex-Governor W. D. Hoard, Fort Atkinson, Wis.

The speaker gave an address upon the subject of education, which was eloquent, wise, and witty, and was frequently applauded by the large audience, composed mainly of townsfolk. He complimented the Association upon the great growth in interest and influence that had attended it since he had first addressed it fifteen years ago. It had been a great educational factor in enlightening the minds of the people as to wiser and more progressive methods. Fifteen years ago it was almost entirely cheesemaking that was discussed in Canada; now butter was also reckoned as of practically equal importance. By a number of striking illustrations, some of them relating to army life, the speaker held the close attention of his delighted audience while he contrasted education through practical work with mere book or theoretical knowledge.

In making his application the speaker said: Look at England to-day, with all her conquest, with all her genius, with all her literature, with all her scholarship—what has brought to England to-day some of the brightest of her triumphs? From that little country has gone out nearly all the leading breeds of cattle, horses, sheep, swine and dogs. And who was it that projected the thought that developed those animals, and made them what they are to-day? It was the cultivated, intelligent brain of England that did it. Who was it that made the lordly Shorthorn what it is? The British. And the Hereford, the Devon, the Ayrshire, the Polled Angus, the Jersey, and those other glorious breeds of cattle; the magnificent Clydesdale, and the other great classes of cart horses, who brought these to perfection? It was the intellect and educated brain of the British people. Who produced by the mysterious and wonderful laws of life and progression, and brought to their present splendid form, those magnificent breeds of sheep which to-day lead the world everywhere? Great Britain. What part of England did it? It was the cultivated, brainy part. Shall we turn over the possibilities of agriculture to the ignorant? God Almighty, the great architect of the universe, has hidden in agriculture some of the grandest secrets. Let us have a higher meaning and broader view attached to the word "Agriculture." In this science there is a field wide enough to interest the mightiest intellect, and to furnish employment for the most erudite mind. There is too much said about the dignifying of labor by man. The Redeemer of mankind had already dignified labor; it is for us to justify labor by putting into our work our best intelligence and energy. He was the greatest laborer in the universe, and His example gave the true dignity to honest toil.

The following practical hint was given during the address: It is time we were taking a broader view of the relation of culture to agriculture. The farm boys should be interested in their work. I talked to a lot of boys once with a clover leaf as my text. They were the most interested lot of lads I had ever seen. They said that never before had they heard anything like it. You wonder why your clover dies. Clover naturally dies as soon as it has provided seed for the production of another crop. Allow your clover to seed and it dies at once. Cut it before the seed forms in order to preserve it for next year. Oats will serve very well as a cover crop for clover, but they should be cut before the grain forms. I discovered this by observing a field of oats which once grew near a barn in Wisconsin. Part of these oats were cut green for the baiting of horses, and where this was done the clover that had been sown in the oats showed a vigorous growth. Where the oats were allowed to ripen, the clover did not do so well. The reason for this is clear. Five hundred pounds of water is evaporated in producing one pound of oats. That means that the moisture necessary to develop the clover crop is taken for the building up of the oats. Give the clover a chance by cutting your cover crop of oats while the latter are still green. All over Wisconsin this system is now being practised, and with most satisfactory results.

I was delighted to hear the Minister of Agriculture speak to-day. John Dryden is regarded by us all as one of the ablest agriculturists on the continent. He is a man whose utterances on questions relating to the farm are conned as carefully in the United

States as those of any man over there. He was right in placing the farmer as the great objective and projective and productive point. I saw it also years ago, and in all my work I have considered the farmer as the man who must be awakened and stirred if we are to have the full results of our opportunities. The farmer who is educated—not merely according to the schools—is the man the country needs most of all. (Applause).

AGRICULTURAL EDUCATION.

By Prof. J. W. Robertson, Commissioner of Agriculture and Dairying, Ottawa.

The great departments of activity within the nation are becoming better correlated to one another. The efficiency of each is being improved with decided advantage to all. So far as the Department of Agriculture is connected with these, they may be mentioned as production, transportation, distribution, legislation and education. The main aims of education, on the side of it which looks out towards and leads out to material progress, are to develop intelligence, enlarge practical ability, and promote co operation.

Mention should not be omitted here of the actual steps which have been taken by a great many different agencies in helping on the great national movement for the improvement of agriculture in general, and dairy farming in particular. The first Dairymen's Association of Ontario was formed in 1867. It and the others which have been organized since, have diffused information in an attractive and effective way These Associations have brought to the front men who have been worthy leaders and who have been successful in leadership from personal ability and from liking the people whom they sought to help. A great factor in the progress of dairy farming has also been the commercial talent of the men who have purchased the products and exported them to Great Britain. These men have passed on to the manufacturers and the farmers who supplied the milk information of a directly helpful sort. Then, the exhibitions, travelling dairy instructors, dairy schools, illustration dairy stations, and bulletins, have all been agencies contributing their quota of assistance. The bulletins published by the different Departments of Agriculture, the newspapers, and the agricultural papers, have been powers for good among the people in connection with this work. These are sowers of seeds, seeds which spring up, seeds of opinions only in many cases, but seeds from which have arisen the opinions of the people ; and these have had a marked effect on their attitude, on their chararacter, and on the ideals towards which they have striven and are still striving. As one instance of the particular value of good illustration work in dairy farming, let me cite a case from the beginning of co-operative dairy farming in Prince Edward Island. In 1892, one illustration dairy station was started by the Dominion Department of Agriculture. Part of the cheese from it were exported to Great Britain, of which part were sold for fifty-six shillings and sixpence per hundredweight. Ordinary finest quality cheese from Canada at that time were selling at fifty-six shillings per hundredweight. That sixpence per hundredweight additional put new hope into the then-and-future dairy farmers in that Province. The "sixpence extra" brought hopefulness, confidence in their own ability, and enthusiasm. The exports of cheese from Prince Edward Island in 1900 were over one hundred times larger than in 1892.

These educational agencies are affecting the practice of dairy farmers in all parts of their work. They are bringing about a better understanding of soil, plants, animals, and products, and how to manage these to get the best results from each in proper relation to the others. To most dairy farmers now, the cultivation of the soil has a meaning much clearer than it had in former years.

It is perceived now that cultivation is a means towards providing seed bed, suitable for the particular crop to be grown Cultivation is not only to make a suitable seed-bed for the root-hold of the plants ; it is to kill weed which are the great thieves of plant food and mainly the thieves of the water, which they evaporate into the atmosphere. Surface cultivation keeps the moisture near the roots of the plants. Experiments at the Experiment Station in Michigan show that frequent cultivation between rows of Indian

corn made a difference of eighty-six per cent. in the yield over the uncultivated. Frequent cultivation gave an increase of seventeen per cent. over partial infrequent cultivation. Surface cultivation makes a loose mulch of soil which arrests the capillary movement of the water from beneath; and leaves it available to the roots. For nearly all the crops, the ideal method of surface cultivation is to roll the land after they are put in (that makes the soil warmer), and then immediately before the plants are up, or after they are a few inches high, to harrow it lightly to make a surface mulch—that makes the soil moisture available and prevents drying and cooling the soil by rapid evaporation until it is shaded by the crop. All matter taken up by the roots of the plants is taken in solution. It has been estimated that for every ton of dry matter which a crop contains it has thrown off through its leaves not less than 300 tons of water in its growing. Then there is the solvent action of juice from the roots of the plants. Exudations from the roots touch mineral matters and dissolving them make them available for the rootlets to take up.

It is a means of promoting the activity of forms of bacterial life which are helpful to the growth of crops, and is a means of conserving moisture, the proper supply of which in a large measure determines the abundance or bareness of the yield. I remember the time when at least one lad, harrowing with a pair of colts, knew no more than that harrowing was to get over the largest possible area of ground and to raise as much dust as possible. There are older men still in many walks of life who do not discern that men in harrowing should always have an eye towards the harvest and not towards raising dust.

The speaker then explained the systems of rotation of crops recognized as standards, and came to the following conclusions: The great increase in crops grown in rotation over those grown continuously, seems to be because more nitrogen is available to the former; and perhaps because it is available during the early period of their growth, from the preparation of it by the preceding crop or by the cultivation of that crop. Other benefits from systematic rotation of crops are (1) the distribution of the mechanical operations of the farm over the season; (2) the opportunity for cleaning the land; (3) the comparative freedom from damage by insects; and (4) the production of a variety of products for feeding to live stock and for sale.

I have spoken of the availability of plant food in the soil, and the making of it more so by cultivation and a rotation of crops. I want to speak also of the power of the plant to take these things out of the soil and the air—the inherited power of the plant. A plant has inherited its initial vital power from all the crops through which it came—all the ancestors through which it ascended or descended. An appreciation of the inherited as well as the acquired power of plants will be of assistance in selecting the kind of seed that will do best on each farmer's land. What I want to make clear is the difference in the vigour of growth between seeds of the same variety when sown in different localities, and the difference—the amazing difference—in the productiveness of selected large plump seeds over small seeds of the same variety.

The seed of a cereal is a plant in embryo and a store of food for the nourishment of the young plant after it awakens into activity (germinates), and until it takes in food through its rootlets and leaves. The germination of the seed is not the so-called creation of life. That happened when the plant was fertilized; and the seed is an embryo, with a store of food lying close by it and within the same skin. The store of food which composes the greater part of the seed is for the maintenance of the young plant until it is able to take enough nourishment through its leaves and rootlets. A young plant is wakened up as soon as the moisture and warmth are sufficient, and its food close by is prepared under the same conditions.

Sometimes an embryo plant is imperfectly formed and weak; and tests show that imperfectly ripened seeds, under ordinary conditions, do not give nearly as good a crop as fully ripened seeds, in each of which both the embryo and its food have been fully prepared. Those seeds which germinate most quickly are the best, and it has been proven over and over again that heavy seeds give larger and better crops than small seeds of the same sort. This has been proven over and over again. The reason seems to be that in one case (large seeds), the supply of food for the young plant is plentiful when it most needs it, while in the other case (small seeds), the food supply may be insufficient to nourish the young plant adequately at the most critical time when it is tender and strug-

gling for survival. Under the most favorable conditions of temperature, moisture, and food supply in the soil, small seeds might give as much in crop as large seeds. On comparatively poor land in unfavorable seasons, is where the small seeds give their worst returns. The farmer who has rich soil in a fine condition of tilth is the only one who can afford to sow small seeds, and the risk of comparatively small crops is great even then.

At this point the speaker exhibited in glass jars specimens of peas developed by selection as compared with peas grown in the ordinary way, and then continued :

The following quotations, from an article in the Year Book of the United States Department of Agriculture for 1898, shows what may be expected from a careful system of selection of seed grain from the most vigorous and most productive plants in any plot or field, when that is followed up with intelligence from year to year :

Showing Effect of Selection. "Selection is one of the most important factors in plant breeding, the natural capacity of all plants to vary furnishing the basis on which the breeder has to work"

"The largest ears may grow on comparatively unproductive or weak stocks, and therefore to obtain the best results seed corn *should be selected in the field*, and attention given to the habit, productiveness, general vigor, etc., of the plant, as well as to the character of the ear, kernel, and cob, and uniformity in ripening. The same remarks apply to the selection of seed wheat"

"Allen cites an interesting case of increased yield in corn as a result of selection, as follows : 'Four years ago my foreman, at my earnest request, began the selection of field corn for seed purposes. He grew the White Dent Red-cob variety. Before harvesting the main crop he went over the field and selected the lowest growing, stocky stalks, with two perfect ears each. He has followed the same plan ever since, with *an increase of fully 25 per cent. in productiveness.*"

Turning to another subject, Prof. Robertson said : "Tuberculosis is the great pestilence which is carrying off the brightest and best of our land. The greatest enemy of tuberculosis is sunlight. Breeding takes place in dark rooms. The germs cannot stand two hours of sunshine ; and yet some people think more of the color of a carpet than the bloom of health on the cheeks of a girl. If you have green shutters on your windows, go home and make a bonfire of these, and let the light of heaven into your house. Whitewash your stable and dairy barns twice a year. This done, a great deal will have been accomplished towards sweeping away one of the most dread diseases to which we are now subject."

PRIZE ESSAYS.

Mr. J. A. Ruddick, who was appointed to judge the essays on Butter-making and Cheese-making invited by the Association, and for which valuable prizes had been offered, gave his decision as follows :

Essay on Butter-making : First prize, J. W. Newman, Brockville ; second prize, J. M. Livingstone, Pembroke.

Essay on Cheese-making : First prize, R. W. Thompson, Springbrook ; second prize, Anson Thompson, Roebuck.

In making the awards Mr. Ruddick spoke highly of the character of some of the papers submitted, more especially of those receiving the first prizes.

REPORT OF THE NOMINATING COMMITTEE.

The report of the Committee on Nominations was presented by Mr. James Whitton, and upon his motion, seconded by Mr. Carlaw, the report was unanimously adopted. The names of the officers for the ensuing year appear on page iv. of the report.

Mr. Derbyshire said he had been for a number of years President, and had endeavoured to do his best to advance the interests of the body. He had not solicited the position, and thanked them heartily for this renewal of confidence. He trusted the coming year would be the best in the history of the Association.

PROFIT IN POULTRY.

By F. C. Hare, Director Dominion Poultry Fattening Stations, Ottawa.

There is a great affinity between the poultry trade and the dairy industry, as women have so much to do with the care of milk, and of eggs and poultry. What the Government is doing is not intended to interfere in the slightest degree with private enterprise. On the contrary, it is for the purpose of stimulating private enterprise. We are trying, through the stations that have been established, to show the profit that is to be derived from properly finished poultry. We are doing this in order that private enterprise may be induced to take it up and push it as a commercial undertaking. Results along this line have already been attained. The gentleman who had the Government fattening station at Woodstock a year ago has since established a station on his own account, and last fall he shipped six tons of chickens from that station to England, and he has a thousand more birds up fattening now.

Certain facts have been demonstrated as a result of the Government's experimental work in the fattening of chickens. Take the results of one experiment by way of illustration. One lot of chickens killed in an unfinished state, gave 2 lbs. 6 oz. of flesh, and 1 lb. 11 oz. of bone. A precisely similar lot of chickens, after five weeks' fattening, gave 7 lbs. 6 oz. of flesh and 2 lbs. 2 oz. of bone. There was an increase of 5 lbs. in flesh and only 3 oz. in bone. This is one of the great advantages in fattening : you pile on a great lot of flesh with very little addition to the bone.

Now, what does the British market call for in chickens? Plumpness of breast, whiteness of skin, fineness of flesh, small bone, and little offal in the form of comb and leg and neck feathers. All the pin-feathers should be carefully removed, as these, if left on, give a bluish tint to the skin.

What sort of fowl best fills the bill? The White Wyandotte is good, but the Barred Rock is best of all. The Rock has no leg feathers, moderate waste in comb, it fattens well, and gives a lot of fine edible meat. At the Bonville, Que., fattening station, some Rocks, at six months, were brought up to 8 lbs. ; at the Whitby station, Mr. Brant added 2 lbs. 7 oz. to the weight of Rock pullets in four weeks, and without the aid of a crammer. There is no money in Leghorns as fatteners. Four of these were experimented with at the Prince Edward Island Station, and after five weeks' feeding, there was no gain at all. Cochins are objectionable because of the feathered legs. It does not pay to grow a superabundance of feathers on fowls raised for commercial purposes. It requires as much nutriment to put on one pound of feathers as is used to make four pounds of meat ; and, as English buyers take the whole bird, with the feathers on the lower part of the leg and on the neck, they do not want too much of this offal because that counts in the weight. Another advantage in the Rocks is that these fowls are good layers at this season of the year when eggs are going at 30 to 40c per doz.

Now, as to fattening. This should begin when the chicks are about four months old. Our experiments show that more economical results can be produced by fattening in crates than by fattening in ground pens. Ground oats and skim milk, of the consistency of porridge, have given the best results. Nothing will take the place of milk for mixing with the grain ; it cools the blood and takes the place of green food. That is where poultry production is allied with dairying. We have had difficulty in getting milk at some of our stations, but you have lots of it. During the first week feed sparingly, otherwise the chicks are liable to go off their feed. Towards the close of the period add a little tallow ; this gives juiciness of the flesh. Starve 36 hours before killing.

Mr. Hare then explained the use of the moulding-board and the bringing of the legs up alongside the breast as a means of giving an appearance of plumpness to the dressed carcass. A member of the Association here asked the speaker if this practice of "shaping" fowl was moral—that it looked like an attempt to deceive.

Mr. Hare thought the practice could be justified. It did not injure the quality of the meat, while it added much to the appearance of the bird. Moreover the English market demands that style of preparation, and if we do not meet the demand others will do so and take the profit. Besides, there is a close connection between the eye and the appetite ; a neat and attractive appearance gives relish.

Birds properly fattened will bring 15 to 16c per lb. in the English market and the demand is unlimited. The Government's agent in Liverpool, Mr. Grindley, will look after private shipments just as he looks after public shipments.

Mr. Hare intimated that the Government intends to continue the experimental stations during the winter as a means of showing by illustration the best sort of fowls to raise and how to raise them. In reply to a question he said he preferred an incubator to a hen for hatching, as there were no lice in the former case. A hundred egg incubator would cost about $22.

Mr. Everts: There is difficulty in getting enough good chicks to supply the demands of the local market even. Those that we have obtained in the Smith's Falls district are very poor and exceedingly badly dressed. Our best supplies were picked up along the Brockville and Westport Railway.

Mrs. Yuill, of Carleton Place, was invited to the platform to add her quota to the discussion on poultry, on account of her experience as conductor of a poultry experiment station for two years. Among other things she said: I am thoroughly in favor of the use of incubators. I have hatched 84 chicks from a lot of 112 eggs and 90 from another. I believe I would have done better with my own eggs These eggs were obtained from London. From a third lot of 112 eggs, I hatched 103 chicks. Not only do you get a larger proportion of chicks from an incubator, but you get better chicks. Some of my hen-raised chicks weighed 1 lb. 2 oz. less than incubator chicks of the same kind and age. This I attributed to the fact that the hen trailed the little chicks through the wet, while the brood kept them warm and dry. Take my advice and never set hens.

But in using a brooder you must be careful and cleanly. Keep the brooder up to 90 degrees for the first three days. Give very little food for the first 24 hours. Stale bread, steeped in milk and then pressed in the hand as hard as possible, makes a good feed for a start. I put sheets of paper on the floor of my brooder and have little wooden tables from which the chickens eat. I wash the tables after each meal and change the papers on the floor every night and morning.

Can you pick good layers from a flock of chicks? You can; but you will never do it if you lie in bed until six o'clock in the morning. (Laughter and applause.) Get out early and notice which chicks come out first in the morning to hunt grubs. These will make the best layers, because the active hen is the laying hen. I have had chickens hatched on the 27th April that laid in October, and from which I have sold eggs at 40 cents a dozen.

The market is always looking for something extra choice. A few of my chickens went to Montreal. The man who got them at once wrote to arrange for a regular supply next season. Four times next season he wrote me in regard to the same matter. It was not a question of price; it was simply a question of ability to get supply.

REPORT OF INSTRUCTOR RABB.

It affords me pleasure to submit to you my first report as Instructor and Inspector of Creameries for the Dairymen's Association of Eastern Ontario, and as I have found it almost impossible to reduce an account of my work to a tabulated list of figures, I beg you to receive it in general statement.

There is little doubt but that the high price of cheese and the resultant persistency of some manufacturers to make fodder cheese, has, to some degree at least, lessened the present onward move of our butter making business: but when we know that quite a number of new factories—and superior ones, too—have been built during the year to run through the whole season, and many are continuing to do spring and fall work, we can say, taking the district as a whole, much progress has been made, and the outlook for the future is very bright.

I have endeavoured to give immediate response to every call, but sometimes, owing pressure of work elsewhere, I could not act as promptly as I had wished; but, sooner later, I have attended every one, and to some factories I have paid two or three visits.

My work for the past year has chiefly been instructing in testing milk, in making butter, and in the proper handling of separators, and, believing that much of the future success of the dairy business of this part of the Province depends upon proper testing, upon proper separating, and, of course, upon proper making, I have endeavoured to be thorough, as I am satisfied that our makers will do well when they thoroughly know. I have endeavoured to instruct men that they may know how to make a thorough and efficient test, one they can stand right by, one by which they can show, that it is possible to know by the use of the Babcock test just what milk is worth. To accomplish this I have placed the necessary machinery in their hands and let them know that by actual practice. I have tried to show men how important it is to the producer of the milk, to the manufacturer, and to the business generally, that he should know all the ins and outs of the separator that nothing but skimmed milk, in the fullest sense of the word may remain. Then, too, I have aimed at having a class of makers that will know good butter, that will have a desire to make the very best, and if I am allowed to judge of work done, I believe we are started on the way to this ideal.

In conclusion let me say that I hope and believe that before the close of this season the work of these makers will be seen and felt in the quality and quantity of the out put and, as a result, in the financial profit.

A. B. Rabb.

REPORT OF INSTRUCTOR WARD.

I have the honour of now presenting to you my third annual report, as Instructor and Inspector for the Dairymen's Association of Eastern Ontario, for season 1900. I commenced work on April 27th and finished on December 6th, spending in the employ of the Association 182 days, as follows:—166 days giving instructions, on cheese-making, testing milk, and visiting factories; 5 days attending cheese boards; 9 days travelling, settling milk cases, and making collections; and 3 days detained on account of rain.

The number of factories visited was 76. Of this number 59 were under my charge, and received two and three official visits each. Of these 59 factories, 19 pay by the per cent. of butterfat; an increase over last year of 8 factories. In accomplishing this work I made 286 visits and calls. In the 40 factories which I tested, 5,275 samples of milk passed through my hands, of which number, 36 were found to be deteriorated; a large decrease from last year. I settled 16 of these cases, 4 were let go by furnishing affidavits of innocence, and the balance were dealt with by factory management.

I did not have the unpleasant task of settling as many cases as last year, but I made them contribute larger amounts; in four instances, $50 a piece.

The total amount of fines was $430. Half of this amount, less $25.28, which was half of solicitor's fees, goes to the credit of the Association. Received from the boards $400 Balance due the Association from last year's business, $12.28, making a total to the Association of $602.

There has been an improvement in the quality of cheese in my section as a whole during the last season, and very much less fraud in the delivery of milk. There is also a substantial improvement in equipments and cleaniness both inside and out. But let us not be content below the top notch—perfection. I would again urge owners, makers and managers of the necessity of educating their patrons to the fact that it means dollars and cents to them to see that their milk is delivered clean, sweet, pure, and in the best condition possible. Think of the loss to this country in dollars during one season, if one-tenth of a pound of milk is lost on each pound of cheese, from this cause.

I cannot finish this report without sounding a warning against the return of whey in milk cans, a practice that should be abandoned by every factory, and adopted by none in the future.

If we expect to retain the hold we have on the markets, it must be by eternal vigilance in cleanliness and skill, all the way from the producer to the consumer.

R. W. Ward.

REPORT OF INSTRUCTOR H. HOWEY.

I have the pleasure of handing you my sixth report as Instructor and Inspector for this Association. I commenced work on April 30th and ended Nov. 17th, working in all 161 days. Of this I spent 139 days giving instructions and testing milk, 4 attending cheese Boards, 6 settling milk cases, 5 driving, 1 attending court and 6 rain.

The number of factories visited were 58. Of this number I found 25 patrons sending deteriorated milk ; 20 of them had fines imposed on them ranging from $10 to $40, amounting in all to $445.50. The remainder were settled by the officers of factory.

Out of the amounts received in fines $27.56 was paid lawyer's fees, leaving a balance of $417.94 to be equally divided between factorymen and Association.

The amount contributed by factorymen for my service was $341, which with the amount of fines makes a total to the Association $549.77.

This report I have confined to the work actually done, but I shall be pleased to give any further information

H. Howey.

REPORT OF INSTRUCTOR BENSLEY.

I have the honor of presenting my eighth annual report as Instructor for the Dairymen's Association of Eastern Ontario, for 1900. I began work on the first of May and finished on the third of November, working in all 157 days. Of this time I spent 140 days instructing and inspecting, 1 attending cheese board, 5 settling milk cases, 8 travelling and 3 lost on account of rain. Number of factories visited officially was 73.

Out of 5,000 samples of milk tested 21 were found to be deteriorated ; all of these parties had fines imposed on them amounting to $335. The amount contributed by factorymen for my services was $380, which with the amount from fines $167.50, makes a total to the Association of $547.50.

As the work of an Instructor is much the same from year to year it is scarcely necessary to repeat what has been given in previous reports. Suffice it is to say I have endeavored to do all in my power to assist the makers in all the difficulties with which they have to contend in cheese making.

George H. Bensley.

REPORT OF INSTRUCTOR ZUFELT.

I have the pleasure of handing you my fourth annual report as instructor for this Association. During the season I visited 65 factories, making in all 148 visits. Altogether I spent 160 days in the employ of the Association. The amount of money collected is as follows : Fees from factories, $500 ; one-half of fines ($390), $195 ; total, $695.

The general condition of the factories is being improved but slowly, and while I would be pleased to report more progress along this line, still there is no denying the fact that there are a very great number where conditions are such that it is a very difficult matter indeed for the maker to get satisfactory results. I think if the manufacturers and farmers were brought to see this matter in its true light, that true economy lay in having everything of the best, the day would not be far distant when poorly built and poorly located factories would be a thing of the past.

This has been an exceptionally hard season to make fancy cheese, owing largely to the heavy rainfall and excessive heat, which made it very difficult to deliver the milk at the factories in the best condition. This has emphasized again the question, " What is the best way of caring for milk for cheese factories ?" Cheese-makers have been in the habit of asking " What is the best way of handling gassy milk, over-ripe, tainted and turnipy milk ?" The best answer that I know is : Don't handle them at all. We have

been starting at the wrong end. We might as well try to build a house by beginning at the top. You cannot possibly make good cheese from bad milk. You may putty up the cracks and disguise the flavors, but the defects are still there and bound to assert themselves again in time. The remedy is obvious. We must begin at the very foundation, the source of supply. Locate the cause, then apply the remedy by removing the cause. "An ounce of prevention is worth a pound of cure," is a most true saying. If the milk is bad, where did it get contaminated, in the factory or its surroundings, on the road to the factory or on the farm? If it has occured at the factory, then the manufacturer has the remedy in his own hands; if at the farm, then the farmer must be helped to locate the source there. Who is going to do this? The cheese-maker, possibly; but will he or can he, and how many of them really try? If a maker sends a can of milk home what happens? You all know without being told.

Do you not think it is time we started out on a new course this first year of the new century? Do you not think we have had about enough "detective" work, and that in the future we should devote our time more to the work of instructing the maker to improve his methods, and the farmer to produce better milk? This is the line we must follow if we wish to improve our goods and maintain the position we already hold in the markets of the world.

This is an era of advancement, not stagnation. We must either advance or retreat. Which shall it be?

L. A. Zufelt.

REPORT OF INSPECTOR PURVIS.

I herewith submit the report of work done by me as your instructor, during the season of 1900. I visited officially 92 factories visiting some of them as many as six times, and spent 164 days in factories giving instruction to makers and testing milk. Four days were spent in driving, three in looking after and settling cases of milk deterioration, and three days detained on account of rain, making in all 174 days spent in your employ.

The amount of money contributed by factorymen for my services was $627, one-half fines and from settlements ($450) $225, making a total of $852.

I am glad to be able to report a steady improvement in the condition of the factories in the east. A large number of the old buildings have been renovated and fitted with good machinery, also there were several new and up-to-date factories erected during the last year, and now the county of Glengarry can boast of several as fine and as well equipped factories as any part of the Province. The makers are also keeping up their interest in their work, and are determined to excel.

Taking it altogether, I think all will agree with me when I say that the past was one of the most successful years on record.

A. P. Purvis.

REPORT OF INSTRUCTOR LOWERY.

I have the honor of submitting my fourth Annual Report as Instructor and Inspector for the Dairymen's Association of Eastern Ontario.

The district allotted to me was the same as in previous years, comprising Brighton, Campbellford, Stirling, and Madoc sections. I visited 85 factories.

The work this year has been much the same as in previous years, and there is very little new to state. During the season I spent 170 days in your employ. Of these, 163 were spent testing milk and giving instructions, five days travelling and calling at factories, and two days settling cases.

Of the 8,211 samples of milk tested with the Quevenne lactometer, and 4,379 with the Babcock tester, 38 were found to have been tampered with. 30 of these parties paid their fines, amounting to $443, and the managers of the factories settled with the

other eight, two of them being expelled from the factory entirely. I am pleased to report that this is only about one half the number of cases I had in the same section four years ago.

But just here I would caution cheese-makers to be very careful about taking in milk the morning the Inspector visits them. See that every man's milk is emptied from his own can and numbered correctly, as the milk drawer is likely to make a mistake that morning, especially if his own milk happens to have some water in it.

The amount of money contributed by factorymen for my services was $385, the amount from fines $221.50, making a total to the Association of $606.50.

Throughout the whole district factorymen are becoming more interested, and see the necessity of better factories and appliances. Some fine factories were erected last season in Madoc section, but there is room for improvement in the majority of factories yet, especially their curing-rooms, as the temperature in the curing-rooms of some of the factories I visited actually registered over 90°. I contend it is impossible to cure cheese properly, made at such a high temperature. Therefore makers in such factories have to make their cheese too firm altogether for the English market.

Another item of great interest to the dairymen in general is that of patrons of factories persistently feeding turnips to cows where the milk is going either to a cheese or a butter factory, as it depreciates the value of the product made therefrom more than double the value of the feed. Cheese from a number of such factories was rejected by the buyers the latter part of this season on account of turnip flavor and the loss sustained thereby was no small item.

Last year I suggested the removal of hog pens from under the milk stands, which proved to be very detrimental to the milk, but driving through the section this season I am pleased to state they have all been removed. I would advise makers to be more particular about the quality of milk received, and not to take in a can of milk but what they are sure they can manufacture into fine goods. Although I am fully aware the makers are handicapped in this line to a great extent, where factories are on every four corners, and when they reject a can of milk on account of bad flavor their neighboring factory will take it in, which is a very bad practice, and should never be done.

I think if cheese-makers would mingle with each other more, and exchange ideas it would prove beneficial to them.

I have invariably cautioned makers about the importance of having a correct thermometer, but I still find some using thermometers as much as 4° out, from which they have sustained considerable loss.

J. B. Lowery.

REPORT OF INSTRUCTOR PUBLOW.

The district assigned to me was the same as in former years, namely, the counties of Leeds, Lanark, Renfrew, and part of Carleton. I commenced work for the Association on May 1st, and finished on November 13th, working in all 158 days. Of this time 130 days was spent in visiting factories, giving instructions, and testing milk. The balance of the time was spent in travelling to factories, attending cheese boards, etc.

The number of factories visited was 90. Of this number 70 received official visits, in 24 of which I found samples of deteriorated milk. After interviewing the parties to whom the milk belonged, fines were imposed in 40 cases, ranging from $5 to $75, the total of which amounted to $879. This is the most unpleasant part of the Instructor's work, besides taking up a lot of valuable time, which might be more profitably spent in improving the quality of the cheese, by giving more attention to the details of the manufacture, and instructing the patrons on the proper care of the milk. I think the object of our work has been overlooked, and instead of being instructors, as originally intended, we have developed into detectives.

The amount received from factories for my services was $500, which with the $439 50 from share of fines, and $10 from share of fine from last season, makes a total to the Association of $949.50.

The majority of the factories that I visited were in good order, but I am sorry to say that a number were positively dirty, and the sanitary condition was not all that is to be desired, and it is needless to say that where those conditions existed, that the cheese was of inferior qu ality.

I have the same complaint to make again this year in regard to shipping of cheese too green, in some parts of the section. It was a rare thing during August and part of September to find cheese more than four days old in the factories. I know of no better way to ruin the reputation of our cheese than to continue this practice, and I would urge every person who has any interest in the welfare of the cheese trade, to do what he can to see that the curing of cheese receives the attention which its importance demands.

G. G. PUBLOW.

DISCUSSION ON THE REPORTS OF INSTRUCTORS.

The PRESIDENT: You have heard the reports of our Instructors. These men inspect factories and give instruction and advice to makers, and to anyone who will consult with them. They go to the Kingston Dairy School, and get acquainted with the best ideas in connection with the work, and disseminate these throughout the country. Upon what they show the makers and the patrons depends largely the success of the trade in cheese and butter.

Mr. NEWMAN: Some of these Instructors are most able men, but they are handicapped by the instructions which they have received. They have to do too much of this detective work. (Applause) This testing and arranging for prosecutions give them too little time for the real work of instruction. If we could so arrange it that they would not have to do so much of this testing and prosecuting it would greatly improve matters so far as our getting instruction in making and handling is concerned. Mr. Zufelt came into my factory last spring, and from the morning until noon he was engaged in testing milk, when he should have been giving us pointers about care of milk, and how to make the best of our product. I have a good class of patrons, and if they had known he was coming they would have met him, and he could have instructed them. But they did not know he was there. We should try to remedy this system of inspection and instruction. Patrons should know days before that the Instructor is coming. In the afternoon he had only a little time to give me hints, and when he left our factory he had to drive forty miles to the next place on his list, passing a number of factories that really needed his attention more than ours. We need him, but not so badly as some of those who never have him. These bad makers are cutting down the price, and should be sifted out. If the cheese-maker is doing nicely, the Instructor should test the cheese, and if all is well pass on to the next factory. If he comes across a bad maker he should stay with him for two or three days, or even for a week or two until he learnt how to make good cheese. The Government has given us a grant, but as they give so liberally for public works they should give equally liberally to build up this great dairy industry, so that in every factory the make of butter and cheese will be better than it ever was before.

The PRESIDENT: If a factory is paying a man only $25, and supply his own tools, it would not pay this Association to give instruction to that man and to that factory. They should get a man who is competent, and pay him $50. If he is competent he will not work for such low rates. But if these factories are not controlled in some way their make will continue to affect the good name of Canadian cheese.

A MEMBER: Who is to blame for this?

The PRESIDENT: Both patrons and makers, but chiefly the former. If I were a patron I would see that I had the right sort of a factory, the proper machinery, and a first-class man. All three are cheapest in the end. Patrons have been trying to cut makers down to a cent and one-sixteenth, or a cent and one-eighth, instead of paying a cent and a half. The tendency to cut down is to practically cut the heads off the cheese-makers, and drive the best men out of the business. The men who own the factory are just as responsible for the quality of the cheese made there as the school trustees are for

the quality of the teaching done in their section. Get an educated maker, and see that he is decently paid for his work. (Applause.)

Mr. Fox: I notice from the reports of the Inspectors that there have been several cases of tampering with milk, though not so many as usual, and that the average fine is about $10. There is a wrong here somewhere. If these men are tampering with their milk there should be no $10 or even $20 fines, but the fine should be so heavy that there will be no more of it. There is too much of the Star Chamber in this matter of "settling." The man is dealt with secretly, and he goes on as bad as ever. Then, again, cheesemakers are not altogether infallible. They may make mistakes, and the farmers' reputation depends upon them. If milk is found to be tampered with the case should be first thoroughly proven, and then the culprits should be either expelled, or they should be made to pay so much that it would be a deterrent. An adequate punishment should be given.

Mr. Eager: There has been a good deal of fault found with our method of inspection. Almost anybody can find fault; but we are looking for the man who can apply the remedy. Mr. Fox has stated that something more should be done to prevent men tampering with the milk. But why should there be any trouble if all concerned—makers, owners and patrons—will act as intelligent men? What is law for? To make people honest. But we do not want law so much as we wish for justice. Now, if we do not start right, how can we expect to end right? We have what is known as the Babcock test for fat in milk. All the men who have been at the Dairy Schools will tell you that is a good fair test. Then why not use the Babcock test, and stop the opportunity for people to tamper with their milk? (Applause.) Sometimes a meeting of the patrons will be held, and a man is charged with tampering with his milk. But his fellows will say, "This is something terrible; it will put a stigma upon our neighbor. He is a good man; he has a large family; he is a leading light in the church." (Laughter.) The Babcock test will prevent that kind of thing. Why pool your good milk with the inferior milk of every Tom, Dick and Harry, and get paid at their price?

Mr. Newman: The farmer must be educated along these very lines. That is the present need.

The President: And we are after him.

Mr. Eager: But we are doing it the wrong way. Here is a man who says he is not in favor of the Babcock test. He has 25 or 30 cows, and the owners say that they cannot afford to lose his patronage, and so the pooling plan is continued. The Instructors cannot do the work that they should do and could easily do if the work was on a proper basis. Every man believes in honesty. Men say: "If we are not honest we will not succeed." Yet the majority of factories are run on the same old pooling system that existed years ago, with all its opportunities and temptations for dishonest doings.

Ex-Governor Hoard: The difficulty, then, lies chiefly with the cheesemaker. He may be too lazy; I guess he does not want to do any more work than he can help.

Mr. Eager: I have had trouble with cheesemakers. I have suffered through them, and perhaps they have suffered, too, on account of this bad system that prevails in most factories. This Association has always looked after the interests of the cheesemaker. But there are some men at the business to day who will never make good cheese if they live for 100 years. You cannot drive a square pin into a round hole. If any young man here is in the business and is not adapted for it, he should get out of it as soon as he can. But there is plenty of room in the cheese trade for first class men, and with good pay. The cheesemakers have now a representative on the Board of this Association. I heard yesterday that there was some talk of a cheesemakers' association. I do not think it can be a success. They tried that in Western Ontario and it did not succeed

Mr. Newman: I am secretary of the new association of cheesemakers. We, as cheesemakers, want to identify ourselves more closely with this Association. We are not combining to raise wages; that was decided upon from the first. The man who is properly qualified to make first-class cheese will get the right wages. But there are many cheesemakers in this part of Ontario who are not members of this Association. Some have been in the Association and have dropped out. I believe that every cheese and butter maker should identify himself with this Association; but I think that such cheesemakers should also meet with our new association, which we would like to be considered a sort of subordinate of this Association. We can meet from time to time to

talk over the interests we have in common as makers. I am afraid that some of you have been trying to put a damper upon our new association.

Mr. EAGER: No. I merely say that I cannot see the benefit of it.

Ex-Governor HOARD: Paying for milk by the Babcock test is a sound principle. I have had a good deal of experience with this method of paying for milk, and I hope you will suffer a word or two from me along this line. There are two classes of men who are putting themselves across the road of progress and are trying to block it. Too many farmers are ignorant of the proposition. They do not know what to make of it because of their ignorance. You can never do anything with an ignorant man until you dispel his ignorance. You cannot reason with ignorance; you cannot drive ignorance; you may not even coax it. You must cast it out altogether. All that you can do is to let in the light that will dispel the microbes of darkness and ignorance. When I was a boy all the talk and good advice directed at me at home had little effect on me at the time. But later on I came to see the light and soundness of that instruction. Many farmers do not inform themselves in regard to these matters of sound dairy principles. The average farmer, indeed, is at cross purposes with himself. At some places, too, you will find a cheesemaker who has been constantly secretly opposing the Babcock test because he felt that he had as much as he could do already. State lines do not change human nature, and I guess it is the same with you over here as it is with us in the United States. In the creamery line I compelled our patrons to come to it. We had rows—we always have rows—but we held on till the men came to. In my own creamery from 1886 to 1891 the fat in the milk averaged 3.97. We took a test nearly every day, and we knew just what the milk was doing. We put in the Babcock test, and in six months' time the fat had climbed up to 4.36 (Applause.) In the insurance business the companies talk about the "moral hazard" There is a certain risk or hazard in some cases on account of the dishonesty or greed of the persons whose property is insured. There is also a moral hazard run in the pooling system in the cheese business. Where did that fat go to from 1886 to 1891? If you would run your cheese factories by the Babcock test you would stop a lot of this humbug, and quarrelling, and foolishness. I have known a great many cheesemakers who have refused to have it by any other way but the Babcock test. One factory I know of lost a third of its patrons, but the manager said, "I will stay with the game until this matter succeeds." One by one all the recalcitrant men came back, and to-day that factory has as much more business than before. Whatever there is of carelessness or weakness we should jack up. I use that phrase in the sense to "jack up" a building. There is a tendency to dishonesty among many men, and we need to get under them and strengthen them—to jack them up. The Babcock test will help us to do this. Now, from that there came in what is known as the Wisconsin curd test. Each patron's milk is also subjected to the test for curd as well as for fat. Do you use the curd test here?

VOICES: Yes

The PRESIDENT: We used it here years ago I guess you got it from us over there.

Ex-Governor HOARD: No, sir. The Wisconsin curd test was discovered by our Prof. Farrington (Laughter and applause.) Two men should come together, and stay there: One is the farmer, who owns the cows, and who knows what belongs to him, and the other is the cheesemaker I say to you, and I say it with all the solemnity of my soul, that the man who does not put right purposes above himself can never achieve a large place in this world. (Applause.)

Mr. EVERTTS: In regard to instruction and inspection, what we want is two men distinctly separate. We want a man employed and paid by the Government to inspect the milk. And then we also need inspectors as we have them now. The man who is appointed by the Government, and has the Government at his back, and who comes to inspect milk, and nothing else, can do a lot of work for good. He will help to make men act more honestly. If a cheese maker desires instruction he should not be hired at all. He should already know his business. In the addresses yesterday the whole talk was about equipment, and buildings, and the general provision for manufacturing. But in what condition do we get half of the milk that is made into cheese? We also get men along the concessions offering to make cheese for a cent a pound. Why, that will hardly supply the furnishings in first-class shape. Too many factories want to hire cheap men. Pay the maker a good price. I have been in the cheese business for about thirty-four

years, and when I ask my patrons to try the Babcock test they generally vote it out. If I have $3,000 or $4,000 invested am I going to sacrifice it if they are against me? In one factory they took a vote and decided to adopt the Babcock test, and of course I am satisfied with that.

THE BABCOCK TEST IN A CANADIAN CREAMERY.

By A. A. Wright, M.P., Renfrew.

Last year, when the annual report of the Eastern Dairymen's Association came into my possession I took it home, and when I read the report of the instructors and inspectors I was astonished at the number of fines that had been inflicted upon patrons for adulteration of milk. I felt like hiding my face in my hands, and bowing in shame to the dust, crying "Unclean, unclean." We boast of manufacturing only good cheese, and why cannot we say that we bring only good, pure milk to our creameries and cheese factories? It can be done. When we started our factory in Renfrew we said we would pay by the butter-fat. There was no objection at first. We paid by the Babcock test. There is no great expense or trouble about that method. One case, however, was likely to be troublesome, and I want to tell you about it. A man came to me, and he said: "My cows have tested 4.1 butter-fat, but now the test shows that they give only 3.9." He thought there was something wrong, and wanted to get paid for 4.1 butter-fat. I told him that cows sometimes varied—the proportion of butter fat went up or down. "All right," he said, "you cannot get my milk." This man had 24 cows, and was one of our leading and most intelligent patrons. But he had a wife like Mrs. Yuill, who got up at five o'clock in the morning. He took his milk home, and told his wife about it, and said that in future he was going to have the butter made at home. "All right, John," she said, "but if you want to manufacture our milk into butter here at home you will have to do the job, for I won't. You must take it to the factory or churn it yourself." That settled it. The women of this country would need to have seven heads and ten arms to do all the dairy work if it were not for factories and creameries. We have had no more trouble with that man. (Laughter and applause.)

We have seven skimming stations and one central factory in connection with our Renfrew creamery. We find that the people are anxious to know the quality of the milk of their cows. Every fortnight the result of the milk test is put up. The patrons come and see the quality of their milk. Now, I do not want to reflect upon any particular breed of cattle, but there was one breed that tested very low. But there was no real trouble, for the owners said, "Well, our cows test low, but they give a large quantity." One man was anxious on one occasion to show that his cattle were richer in milk than his neighbors' cows were; but he rather overdid the thing, and it was soon found out, and that was stopped. There are no fines now, no heartburnings, no suspicions, everyone is satisfied. If the manufacturers of cheese say, "We are going to pay by the Babcock test," the thing can be accomplished. The cheesemakers have to do a great deal of work, and if you put any burden upon the cheesemaker, and then reduce his pay, it is more than flesh and blood can stand. Pay the maker a decent rate of wages, and he will be able to do all this work in a satisfactory way. The thing can be done, and with very little extra trouble in the long run. What is the reason we cannot get a Bill passed to make this necessary? If it comes under the power of the Dominion Parliament I shall at the next Session, if you so desire me, introduce a Bill compelling cheese factories to pay for milk according to the Babcock test of butter fat. (Applause.)

Mr. Fox: Well, that has to come back to the farmer, after all, and if he does not like it he has a chance to settle it at the polls. Here is a man who lives three or four miles from the factory, and he wants that milk in at half-past seven in the morning. If

he has a large dairy it will be difficult for the milk to be brought that early. Mr. Purvis will come to a Farmers' Institute and tell us that cheese that would go on the market and prove to be a fair cheese can be made out of milk containing only one per cent. of fat. If that be so you cannot get the farmers to be enthusiastic for the Babcock test.

Mr. PURVIS: What I said in this connection is that in cheese there were certain constituents, such as fat, casein and other solids, and that fat was very important, but that casein was also important; that while all the fat should be in the milk in order to make good cheese, so every other element should also be in the cheese in right proportion. I showed that it was possible to make a cheese from milk of a low percentage of fat, passable for market, providing skill was exhibited, and that all the other constituents of the milk were there. Of course I did not advocate making such a cheese, or claim that everybody could do that. My object was to emphasize the importance of the other constituents making up cheese. My speech at that Institute meeting, taken all together, would not leave the impression that I favored cheese with a low proportion of fat. We want all the fat.

Mr. RUDDICK: Rich milk will make more cheese than poor milk, and it will be slightly better cheese. It strikes me that we have been losing sight of a very important point in connection with our work of instruction. When the Instructors read their reports to-day I was greatly struck with the amount of time taken up with this matter of milk testing. It appears to me that that is the thing that seems to alarm the patrons more than anything else. I can assure you that the cheese factories of this country lose ten times as much from impure milk as they do from adulteration or skimming. I agree with what Mr. Newman said, and I think he was not taken up in the way he intended to express himself. We are giving a lot of attention to makers who are themselves able to be instructors, and are wasting time of our Instructors in putting them at the work of testing, when a man with two weeks' instruction could perform it just as well. It takes years to fit a man for the work of instruction, and he should not waste his time in testing milk except on special occasions. I am afraid that in this country it will take years to bring about the matter of a compulsory test. In New Zealand every factory pays by the test, and the question of milk inspection never comes up. They have no need for it. At the time this work of instruction was inaugurated in Ontario the conditions were different to what they are to-day. In 1889 we had not the Babcock test; there were few methods of testing, and these were not in the hands of every cheesemaker. But now we have the Babcock test that should be in every factory, and we have dairy schools where men may go and learn how to do all the work that is required about a cheese factory or creamery. The men who have attended these schools are just as well qualified to do the work of testing and inspecting milk as any of our Instructors. It seems to me that the suggestions laid down in Mr. Zufelt's report are well worthy of consideration, and I think it would be wise to devote the work of our Instructors to instruction pure and simple. Under the system where an Instructor depends upon the number of factories visited for part of his salary he will be tempted to try and visit as many as he can. That is just what I did, and I would do it again under the circumstances. They have to call, do what they can, and hurry away. The Instructor should be allowed to stay longer. The New Zealand Government gave me three Instructors to assist me in my work. But you would need a small army of men to do the work here in the same way. I told these men to go to a factory and stay there as long as there was anything to do, and let them know that we expected to see some result of their work. In some cases they remained a week. The first day they considered local conditions, and then they gave their attention to the milk, mounted bicycles, visited the patrons on their farms, and gave hints to all who needed them. They bestowed their attention to the points most demanding their help, whether on the farm or in the factory. It is by the poor milk sent to the factories that the better patrons are losing heavily rather than by adulteration by others. I think it is about time that the work of inspection and instruction should be divided, as they are really two different things. The conditions have changed since we established the system here, and we must keep up with the band waggon.

Mr. DARGAVEL: I am sure that the directors of this Association are only too glad to hear suggestions that are meant for the betterment of the dairy industry, either from cheesemakers, or from so high an authority as Prof. Ruddick. I can quite sympathize

with what Mr. Newman said and the suggestion is very good indeed; but with our limited means can we make it practicable at the present time? These things require a good deal of money, and I am very sorry that this discussion did not occur yesterday while the Minister of Agriculture was with us, for he holds the purse strings so far as agriculture is concerned. We feel grateful to the Government for what they have done in the past. Last year when we appealed to them for an increased grant they responded, and we got a larger grant. But to enable this Association to do all that has been suggested by Mr. Newman, Mr. Everttts and Mr. Ruddick would entail a still further expense, which I am afraid we would not be able to meet. The dairymen need to first convince the Government that the money is required. If we can do this the grant will likely be still further increased. It would require an army of instructors to visit every farmer and give him instruction. The child must creep before it can walk. I do not think there is any association for the advancement of dairying on the continent of America that has done so much for the industry as the Eastern Dairymen's Association has. With the money granted to this Association we have accomplished wonders. Certainly we have done more in the way of instruction and inspection than the Western Association has. We have been employing seven instructors and sending them through the country, while our sister Association has had only a couple. I claim that the instructors should be paid by the factorymen and cheesemakers. The money paid in fines would pay for the work of inspection. I am willing as a proprietor to chip in and help. (Applause).

Mr. PUBLOW: You do not need an inspector; matters can be remedied in a better way. Inspecting milk for prosecutions is the meanest work in the world to have to perform, although past conditions necessitated it. But now we have three dairy schools in the Province. What are they doing in the summer? Practically nothing. Do you want the milk inspected or not? If you want to trust all your neighbors, then go on and pool it. But have a Babcock test put in the factory. If you find that any milk goes wrong have samples sent in to us sealed. If the milk does not test up to the mark have the man prosecuted. This milk belongs to yourself. Do not think that because you get milk to the factory in any shape that that ends the matter. It is only the starting point. Your maker should be so educated that he knows just how to educate you, so that you will produce the milk in the best possible manner. You should know that that man has come to you to make good cheese out of milk. See that he is a man who knows his business thoroughly. See also that the man who sells and ships the cheese will not let them go out of the factory unless they are in their best possible condition. See that they are put on the market in the best possible style and condition. In that case the matter will be settled. The patrons and the makers are the best abused persons in the country. Some makers get milk that no living man can make good cheese out of. But it is possible that the fault of a bad lot of cheese may be with the milk, or the factory, or the maker, and sometimes with the salesman. But dairying pays when properly conducted.

Mr. EVERTTS: If you wait until you see a farmer having his neighbor prosecuted and fined you will likely live to see the new century out. No one cares to inform on the man living beside him. The inspector and prosecutor needs to be a man who is employed by the Government, who will drive terror into the hearts of the rascals.

Mr. PUBLOW: The Government has done a lot for the people. Your makers should be sent to the Dairy Schools to be properly fitted for their work, and learn how to test milk. If the Government would grant enough to do the work of instruction more largely the money could not be better spent. What is the object of sending out instructors? Is it to fine fellows for adulterating milk, or is it to improve the quality of our cheese? I think it is the latter. When we come to a factory and find a man making bad cheese we will enquire into the reason; whether it be for want of care of the milk, the condition of the factory, or the bad work of the maker. We aim to find out where the case is weak, and remedy it there.

Mr. HENDERSON, a representative of the Pan-American Exposition, of Buffalo, N. Y., was introduced, and in a pleasant and forceful manner put the claims of the great Fair before the convention. He complimented Canadians upon the excellent showing at the World's Fair in Chicago in the matter of dairy products, and said that a great market was opening up in the Southern and Central American countries for these products. He made an excellent impression upon the meeting.

A WOMAN'S IDEAS ABOUT DAIRYING.

By Mrs. Joseph Yuill, Carleton Place.

If we would build wisely we must do so upon a solid foundation Mr. A. A. Wright did that, as he has explained to you, and his patrons send in a better article of milk. I pity some men who have to make butter and cheese with the class of milk furnished them. I was one of the first to go around with the travelling dairy. The facts then known to the few are now known by thousands. I shall tell you only what I have seen and known of my own experience. Mr. Yuill and I once went to a farm not far from here. A little boy was there, and he said to his mother, "Where is the dipper?" She went into the pantry with a swill pail in one hand and got the dipper. They used that dipper in bailing out the swill, and then used the same dipper for filling the tea-kettle. The daughter was washing the cover of the milk can with a dirty rag—getting the can ready for the factory. They had ten milk pails, and one of a couple of cats got up from under the stove and went into one of the pails. All ten pails were washed with the same cloth, after which they were set out in the frost. These cloths were full of bacteria. They get into the milk. We must educate the wives and daughters of farmers to be clean. Do you think I remained to tea in that house? (Laughter.)

When I commenced years ago it was nothing but hard churning. To-day the Government is providing us with model cheese factories and creameries, cold storage, and everything of an advanced sort, and it now remains for the farmer to send such milk as will make the best product for the great markets of the old country. We farmers' wives and daughters have to work in order to make this dairy business a success; and so have farmers generally. When the milk can comes home have it emptied as soon as you can. The way to keep a milk can clean is to keep the whey out of it. Do not make a swill can out of it. After the milk can is emptied wash it out with milk-warm water, rinse the can out thoroughly and clean, then take water that is as hot as you can bear it, with a little washing borax in it. Clean that can as thoroughly as you would your tea-kettle. Put a white plate in the can. At six o'clock at night take the plate out, put it on the table, and ask yourself if you would like to take your meal off that plate. Well, the rest of the can is like that. If a cloud comes over the sun where is the fly? If your cans are left to the flies you know the result. If a fly stays one hour on a white cloth you know what they leave after them. Head off the flies.

The cow stable should be cleaned out one hour before milking is done It should be thoroughly aired so that every bad odor will be taken out of it A great many advocate cleaning the cow's udder with a dry cloth. Now, if you sit down and milk a little into the pail, take it to the door, and you can see some dust on the top of the milk, I say that is not going to be good, pure milk. Use a clean damp cloth in cleaning the udder, and that will prevent the dust.

Every farmer's wife and daughter should be well acquainted with the cow stable. When God made Eve she was to be a help-meet for Adam; and I believe that is woman's place yet. Mr. Yuill was once asked why he allowed his wife to go into the cow stable. I am not above going into the cow stable, and helping if anything is necessary. (Applause.) A greater than I was born in a stable, and there was the best of women there.

Now, I am going to give the men a little rub. We have to hire a good deal of our help. Some of them are not as tidy and clean as they should be. Every man should have a clean pair of overalls. A man will taint milk if he uses tobacco. We had a man once, and he pretended that he was not chewing tobacco when milking. I said "Let me milk on one side, and you on the other." I was hardly able to stand the odor of that tobacco. Now that vile odor must have gone into the pail of milk. I really had to ask myself if the tobacco would kill the germs in the milk, as they kill the insects on our plants. (Laughter.) I was speaking to a man who was milking a cow, and was also chewing tobacco. He would spit on his hands, and also spit on the hay that the cows ate He might as well have given them an onion; in fact the onion would have agreed better with the cows. He also milked different cows, and never washed his hands.

A large number of people strain the milk through a strainer can. But three ply of cheese cloth is better, and a yard of baby flannel is better still, and it is easily cleaned.

The flannel will purify your milk like nothing else. I found that out when making jelly. I was using this flannel for straining milk about three months when Hon. Sydney Fisher sent me a pamphlet about a method of straining in vogue in Denmark, which turned out to be the use of flannel also. A farmer near my home strained his milk through a strainer can The butter-maker sent back word three times about the milk being badly strained. The patron claimed that he had done it properly. They made an examination, and found that when the refuse in the strainer looked too full of frothy milk to feed to the cats it had been put back into the can. (Laughter.)

In sending milk to the factory it should not be left any length of time in the can. We have a lot of Cooley creamers, and we put the milk into ice cold water until we see the driver coming. Now I do not think that butter should be made on the farm at all. The women on our farms have plenty to look after without having to handle butter at all. The farmer's wife or daughter should try and keep dairy utensils thoroughly clean and sweet. And when all the heavy burden of the work has been taken off us surely we can easily keep our pans and cans clean It takes very little to spoil the flavor of milk. If a cat is allowed to touch the edge of a pail it will be enough to eventually spoil that milk. The cheese-makers have got away ahead of the butter people, and a good reason why. The cows are out in the open fields from May to November. They are then housed for the winter, when it is far harder for the butter-maker to handle the milk.

If I was unfortunate enough to have a can of milk sent back to me I would churn it, and send a print of butter to an expert, with a request that it be tested, that I might know what was the matter with it. I have had butter sent to Prof. Robertson, with a request that he would tell me what was wrong with it. That is the best way to do in case you have milk that has gone astray in flavor. I pity some of our cheese and butter makers. Since I have come to Smith's Falls I have had the opportunity of testing butter from three different creameries. One of these was first-class, but another of them had the flavor of the cow stable. If I were making that last named butter, I would make up a pound, and send it for examination to a first-class man to determine what was the exact trouble. If you stand over the separator you will soon find out from the smell if there is a bad odor in your milk. We must pay the closest attention to the purity and wholesomeness of our milk. (Applause.)

CHANGE YOUR METHODS.

By Ex-Governor W. D. Hoard, Fort Atkinson, Wis.

Why is it that so many farmers who know that they are not making a cent resolutely hang on to the same old loss producing methods? Now, without any theorizing on it, I will launch away into a statement of certain facts to show in the experience of other men that there is the encouragement of much larger profits in the practice of modern ideas, and modern methods.

"A man had heard that Jerseys were good butter cows. He bought one that was fresh in milk. He took her from a kind master, a man who understood a cow, to a cold, uncomfortable stable, and turned her out to drink ice water on a very cold day. When she came into the stable, she shivered for an hour, and in a week had shrunk her milk flow one half. That was his idea of cow management—his method. Don't you know of men who think and act just like him? He told me all the circumstances, and said he did not think Jerseys were hardy. That man would have measured a diamond by what he knew of limestone.

When I undertook to show him that a highly organized dairy cow, one that would yield twice as much butter as any cow in his herd, should be treated according to the law of her own being, not according to his bad and ignorant methods, he replied by asking if I thought he was going to "change himself over to suit a cow."

Another: Two men in my county have been dairymen for twenty years. Each started with 160 acres of land and they lived only about a mile apart One we will call A. and the other B. When they started with cows A. was in debt for nearly the price

of his farm. B. was out of debt. A. early saw that he needed the best cow he could get. He was a good judge, and he would pay a large price for a good animal. He became interested as a student in the physiology of the cow, and read everything he could find that would give him more light. B. said it was all nonsense to read so much humbug. A. bought the best registered Jersey sire he could find, and almost paralyzed the neighborhood by paying $300 for him. Twelve years ago he built a silo. That enabled him to nearly double the size of his herd on the same land. Then he took up the study of the feeding problem. B calls A. a crank. A. is now worth ten times what B. is. A. has changed his methods for better ones and is to-day wealthy, intelligent and widely respected. B. is worse off than he was twenty years ago. He knows but little, if any, more than he did then ; his cows are of the same poor sort ; he "don't believe in all this blamed humbug about breeding, feeding, silos and such." His family have grown older and his expenses have increased, but his revenue has remained the same, and now he is in debt. He has rolled the spirit of non-progression under his tongue like "a sweet morsel," until he is ugly and sour at everybody.

What was the cause?

This—he would not change his methods. He would not imbibe knowledge enough to have a good judgment of methods. He would not use his intellect, train it, guide it and refine it. He did not realize how deep this problem of successful dairy farming is, and that a man with a shallow, unfurnished mind cannot fathom it.

We must make milk cheaper if we cannot sell it for more. To do this depends on the cow and the way she is fed and managed. Here is a bit of practical experience for you :

A large milk producer in Ulster County, New York, writing on the subject, says :

"The poorest cow I ever owned gave me 1,000 quarts a year, at a cost of over five cents a quart, while another cow produced over 7,000 quarts, at a cost of less than three-fourths of a cent a quart.

A year ago my food cost per cow per day was 26 15-100 cents. Of this the farm furnished 8 cents and 18 15-100 cents was purchased. On this expense the herd averaged fourteen quarts a day, at a cost of 1 86-100 cents per quart. The ration was : twelve pounds hay, eight pounds corn fodder, ten pounds wheat bran, six pounds hominy and three pounds cotton-seed meal. An effort was made to reduce the cost by a better study of the feeding question, and the following ration was adopted ; twenty pounds hay, three pounds oat straw, three pounds oats, six pounds wheat bran, four pounds buckwheat middlings and two pounds cotton seed meal. This ration cost 21¼ cents per day. Of this 10 cents was raised on the farm and 11¼ cents purchased. The milk yield increased to 15 14-100 quarts a day, making the cost per quart 1 4-10 cents, a saving of nearly one-half a cent per quart per day.

"In 1888 my cows averaged 1,000 quarts per cow, and the milk cost me 2 8-10 cents per quart. Last year the yield was 3,724 quarts per cow, and the cost per quart was only 1 4-10 cents, or a reduction of exactly one-half."

This result was brought about by weeding out the poor cows and putting good ones in their place. To know the good from the bad the milk of each cow was weighed and tested at regular intervals.

"I guess so" was discharged and "I know so" put in his place.

Now, think these facts over and tell me candidly is it not better to abandon our old wasteful ways of managing cows and adopt some of these new ways? Let us always remember that cows cannot yield milk solids without suitable materials from which to make them, and that the cows capable of producing these solids in profitable quantities cannot do so on the coarse fare that is suitable to the lower grades of stock. Neither can they stand the exposure which common stock will endure without serious discomfort and injury.

He Must Avoid Waste.

The Experimental Farm of Ontario reports the amount of food consumed, bedding used, and manure produced, by a calf during the first three years of its life. The total weight, including six tons and thirty-eight one-hundredths of a ton of straw used, 29.64 tons. The manure produced is analyzed, and its value determined on the basis used for

valuing commercial fertilizers. On this basis the value of the manure produced by the calf during his first three years was $118.57.

This shows the enormous waste going on when the farmer does not look after the manure. The fertility or producing power of your land is your capital. Did you ever notice how much less a rich soil feels a bad drouth than a poor one? The vicissitudes of farming are very much lessened by keeping the land rich. One of the chief reasons why I have been so persistent in advocating the use of land plaster in the stables is to save the waste of nitrogen. A cow produces annually about $12 worth of ammonia, which is nitrogen. The land plaster absorbs it, prevents it from evaporating until it can be taken up as plant food. Yet I know of plenty of men who will not pay out $1.60 to save $12.

He Must Study the Feed Question.

Here is a fact clearly demonstrating this: Dr. Babcock found that the use of ensilage greatly increased the churnability of cream. It seemed to produce the same effect that is seen in the cream when the cows feed on June grass. Every farmer's wife knows how much more easily and thoroughly the cream churns at that time than later when the feed becomes drier and more woody. The same effect is produced by the feeding of roots.

Dr. Sturtevant at the Geneva Station found that milk from early mown hay, corn meal, and bran, yielded up 84 per cent of its fat, while that from late-cut hay and gluten meal yielded up only 64 per cent. Here was a loss of 20 per cent because of the kind and condition of the food.

Can farmers afford to shut their eyes to better study and knowledge on this question? There is money in it.

There are 800 patrons of the Hoard Creameries. Among them at each one of the ten creameries are men who produce milk at 50 to 75 per cent less cost than others. Every penny of reduced cost means that much of increased profit. Yet it is very hard to get those unsuccesful ones to study. In these times of low prices they are groaning with financial colic. Yet no man can get them to see where the waste is. Are there any such farmers that you know of?

He Must Develop his Heifers Properly.

In the development of the heifer to be a profitable dairy cow a great deal depends on the sort of man that handles her from calfhood to her second milking year. She must start with good dairy ancestry. That is the foundation but not the superstructure. We have reason to believe that a large proportion of poor cows could have been made good ones if they had fallen into the hands of men who knew how to develop them rightly. Here are the ways: (1) Prevent the growth of fat and the development of beefy tendencies. (2) Use constant gentleness and frequently handle the udder. (3) Breed at fifteen months so as to start the development of the maternal functions while the body is easily moulded. (4) Feed liberally of milk-producing food so as to develop the growth of the udder all that is possible.

An Arkansas man asked my neighbor, O. P. Goodrich, the questions: "How are milk vessels developed in heifers? How is the milk flow stimulated?"

Mr. Goodrich has been a very successful producer of fine cows, and his answer was:

"'Bring them up in the way they should go, and when they are old they will not depart from it;' that is to say, if they are well bred dairy heifers. By this I mean, bring up the heifers to consume large quantities of milk producing food. There are some kinds of food that will induce growth, but not fat. Use such foods."

You can spoil a heifer for milk by feeding her gross fattening foods."

Prof. Roberts aptly says; "If you ask such a heifer to turn all her food into milk she will say, 'I can't do it; you taught me to make tallow.'"

There are lots of spoiled, wasted cows. Good cows are too scarce for even one to be spoiled in the making.

He Must Raise Protein Cheaply.

Science and experience both agree that if we expect to produce milk cheaply and abundantly, not only must we have a good dairy cow, one that is fitted for the business, but we must also fit the feed to suit the cow.

She produces milk ; and milk is the best balanced food in the world. Balanced how? By holding in the best proportions, the three ruling food elements : carbohydrates, fat and protein. The cow cannot change her nature nor her milk. She depends upon her master for knowing enough to do the right thing by her. Poor cow ! How fearfully and frequently she is deceived !

Said an old lady to me once : " Women and cows know how terribly lacking men are." Now if the cow yields a balanced milk abundantly—mind you, *abundantly*—she must have the right food to make it of. Into every pound of milk she is obliged, by a law she cannot escape, to put a certain per cent. of casein or curd, that is almost pure protein. Where will she get it? From her food. How can she get it from the food if the farmer does not furnish the food that contains it?

All of the protein foods are somewhat expensive ; more so at some times than others. The best among them is cottonseed meal. That is the richest in protein. We must buy that ; then comes oil-meal, bran, gluten feed, and gluten meal, all of which we must buy. Can we help ourselves and produce this food cheaper than to buy it?

This is an intensely practical question. For years I have been striving to make the readers of " Hoard's Dairyman " understand this matter. My object is to keep up the yield of milk, and at the same time to leave more of the resulting money with the farm.

Prof. Robertson conceived the idea of putting in the silo a balanced food that would do away with the necessity of buying it in another form. His plan was to grow corn, horse beans, and sunflower heads, and ensile them together in a balanced ratio. The corn for the carbohydrates or starch, the beans for the protein and the sunflowers for the fat. The same object is striven for by those farmers who grow peas or vetches abundantly with corn or barley.

Thousands of farmers have been prevailed upon to include peas in their dairy farm management. They succeed or fail just in proportion, barring adverse seasons, as they understand how to grow peas.

The old Indian said, " Know-a-heap is a big thing when you hunt otter." " Know-a-heap " will pay here to. Some experiments in the way of growing flax with millet and oats, for hay, have been made, notably by Rev. Mr. Currie, of Euclid, Minnesota. He speaks very highly of this combination as a milk food, and says :

" My theory is that during the growth of the plant it has more protein without the excess of oil, so I sowed millet, flax and oats together, and I cut it at a certain stage, and it is the best food I ever had."

The combination was cut when the millet was fairly headed out, and the flax seed, say, half grown.

Concerning this combination Prof. Snyder of the Minnesota Experiment Station, says :

" Mr. Currie's conclusion in regard to the use of flax at a certain stage is borne out by the conditions of the plant during its periods of growth. As the plant matures, the starch is used in the formation of the fats and oils, and he has cut the plant at the proper time when the nitrogenous (protein) property of the plant is most developed.

Now these are hints. Take advantage of them, and see what you can do to solve this reduction of cost, and still keep up quality and quantity of product. There is a right way to grow peas ; they must be planted from four to six inches deep on high, dry soil. They are the cheapest protein food you can grow.

Conclusion.

Let me emphasize the matter once more.

The first factor in the problem of a cheaper production of the milk is the cow—a dairy cow, a good cow. Take the first step first, and make a determined effort to do business only with the true dairy cow. To this end the dairy farmer must become more of a breeder. This is the first step.

The next is the right sort of good dairy food, food that will bring dairy results ; the next, understanding and skill in feeding the right food ; next, the production of the *right* food (*not* some *other* food) on our own farms, as far as possible ; next, the right care and handling of the cow.

The nearer we come to perfection in all these points, the greater will be our profit. We must make milk for a less cost per 100 pounds There is no help for it.

The inevitable growth of the business must bring that result. We must produce butter and cheese at *less cost* if we expect a good profit.

We no longer control the output. Other countries are reaching for our markets. Our own production is increasing. Every line of human effort is in the same category.

We must make milk "by the acre," "by the cow," and "by the hundred pounds."

It is stupid for us to persist in using double the number of acres and cows to produce what one-half of these forces might just as well produce. We must learn to make just as much profit with milk at 65 cents per hundred as we once did with milk at $1 per hundred. We can do it if we will address ourselves to a reformation of our cows and our ideas and methods. To this end the dairy farmer must wake up and spend a little money for his own dairy education. There is not a farm in all this section that cannot be make to keep good cows at a good profit at present prices for dairy products if modern ideas about breeding cows, modern ideas about growing food crops, modern ideas about soil culture, and modern ideas about stables and dairy care were followed out. All this lack of profit which prevails is caused by following ideas which will not and cannot conform to modern necessities.

The great mistake these profitless farmers make is in holding to the idea constantly that they cannot afford to read up on these vital diary questions. I do not know of a single instance where increased profit has not followed increased reading and study. It is the cheapest, easiest way to saturate our minds with better knowledge that will bring a change to better methods and better profits.

Luck in the Dairy.

It would hasten the fortune of many a dairyman if he could get it out of his head that there is no such thing in the business as "good luck." Everything is the result of good calculation, and good energy in seeing that close calculations are carried out. There may be bad luck. Bad fortune may come by accident, but good fortune never. The old saying, "Everything comes to him who waits," is not true—everything waits for him who comes. It is the coming quality in the man—the "get there" quality that tells. You cannot make a good dairy paper on the basis of "luck." It is made by good judgment, accurate knowledge, and constant push. You cannot construct a cow through the processes of dairy breeding by relying on "luck." You must work for it, do everything for it you know how, except to set back and rely on luck.

It seems almost an act of foolishness to say these things, yet I must confess that the men who keep cows in this country are of all men I ever met the most given to trusting in "luck." Ninety-nine out of every hundred cows born into this great dairy field, where brains ought to command, have nothing behind them in their breeding but a trust in good "luck" These cows show clearly what was the judgment and knowledge of the men who bred them. Go to any man's herd of cows, where good dairy judgment and calculation have graded them up out of the cows that have nothing but a trust in luck for pedigree, and you can see the difference at once between good sense and "luck."

I visited once a herd of Jersey cows owned by Adam Stevens, at Ellensburg, Washington. The growth that man has made in trusting to good sound dairy knowledge, not luck, tells the story. He was a range cattle man, pure and simple. It was a good cow on the range that would yield 125 lbs. of butter a year. By accident a dairy paper, sample copy, was sent him. He threw it aside. Then another copy came and he served it the same way; then the third. He stopped to read that. Something met his eye that challenged his attention. It set him to thinking. "Is it possible," he said to himself, "that I really do not understand a dairy cow? I wonder if I had not better look into the matter?" He subscribed for that paper. That put him at once into the society of men who did know about the dairy cow. He read what they had to say about their experience and their judgment. He started with seven poor range cows and a registered Jersey bull at the head. His neighbors sneered and jeered at him. To-day he has one of the finest money-making herds I know of in the United States. How did he do it? Simply in this way: He quit the society of the sneerers and jeerers. He commenced to read and think; he commenced to act in obedience to dairy sense. He was a man who paid no attention to luck, but put

good thinking into action. Now he is one of the most prosperous dairymen I know of. He has done these things on a wild sage farm where he had to irrigate to grow crops. He had not the advantage of a bright lot of dairy farmers about him to whom he could turn for advice. Yet right in the oldest dairy districts can be found men by the hundreds who are practical failures as dairymen. They are filled with their own conceit. No one can teach them a better way. They are handling cows on old worn out notions that do not fit these times, and that bring them no profit. Their farms are growing poorer every day. Prices for dairy products are growing less, and they are getting less revenue every day. Yet out in the sage brush wilderness is a man who is a success, while they are failures. Can these men not see that their ideas and their practices are wrong? Can they not see that there is no profit in the way they are thinking and doing?

Wrong, unsound ideas of this business are sure to establish wrong and wasteful methods. One man near me makes his cows return $2.08 for every dollar he expends in feed for them. He had the good sense at the beginning to secure the kind of cows that with a right method of handling would make that return. He breeds his own cows. A neighbor of his made his cows return 96 cents for every dollar expended in feed. Wherein lay this astounding difference? First in the men and then in the method.

I can find thousands of examples like these all over Canada and the United States.

Dairy progress must depend on the way the dairy farmer educates himself in sound ideas and wise methods. The procession is waiting for him everywhere. His increase in profit and wealth waits for this education. The glory and progress of his state and nation wait for it. Will he see the coming of the light and answer to it?

FURTHER HINTS TO PATRONS AND MAKERS.

By G. G. Publow, Kingston Dairy School, Kingston.

Let me say to the patrons once again that we cannot make good cheese from milk that is not pure and clean, because the bad flavors found in cheese are largely due to some form of dirt originally in the milk. I would like to have certain farmers and their wives here to day, and give them some hints on the care of their milk. Now, I do not think that farmers as a class are dirty, and I believe they try to take care of their milk as well as they know how. But the trouble is that they do not know enough about the proper care of milk. There is a great difference in the flavors in cheese. You may feed turnips, rape, leeks or any strong flavored food to dairy cows, and produce flavors in cheese all of a bad sort, but these will be altogether different in class to those flavors resulting from dirt in the milk. A food flavor will never grow worse; it is at its worst from the start. But this is not the case in the matter of dirt flavors. The flavor resulting from these foods may be removed to a certain extent by careful handling, although it can never be removed entirely. Therefore, never feed anything that will give a bad flavor to milk. But if you can find anything that will produce plenty of milk of good quality, without any taint, use it. Dirt flavors cannot be remedied; they grow worse and worse with the age of the cheese. The very worst flavors are caused by dirt; it does not matter what the source of the defilement may be—whether from the stable, the hands, from dust, or from the switching of the cow's tail. I do not think there is anything worse to ruin milk for cheesemaking than the dust coming off the road. It is full of bacterial life of a nature most hurtful to pure flavor. This bacterial life is like plants; it thrives and develops under similar circumstances. If you have a field well tilled, and you put in the best seed you can procure, what do you desire as the best conditions for the growth of that crop? Just heat and moisture. And so it is with these germs in the milk. They have got the moisture, and now they require only the favorable temperature If the milk is dirty—and road dust or stable dust contains considerable organic matter—then if that milk is not cooled down and kept cool these germs are bound to grow, because they will have all the conditions for that growth. Low temperature will stop bacterial growth. If the atmosphere is at 70° the milk must be cooled down by some means or it will soon

spoil. Butter and cheese making is a process of fermentation, and that is brought about by the condition of the temperature. The warmer the milk is kept the more active these germs will be. Lactic acid is a desirable fermentation in cheesemaking. We want the milk sweet when it comes to the factory, but we must develop acid in it after it is received at the factory, because it is this acid that is to break down the casein and give the desirable flavor to the cheese. The milk when it comes to the factory should be of such good flavor that we can manipulate the curd without any trouble—that is, put in the rennet, cook and cut the curd, and get the moisture all expelled so as to have the cheese in the best possible condition. Bad flavors will greatly delay and trouble the maker. A good many farmers do not know what cheese is really composed of. Roughly speaking, cheese is made up of fat, casein, and water in almost equal proportions. Of course there is also a little mineral matter and sugar. Good flavor is a primary need in cheese. The first thing a buyer does is to bore the cheese and draw the sample across the nose. First the smell or taste, then for body or texture. No matter how closely it bores, if a cheese has a disagreeable flavor it will be rejected. If the flavor is of turnips or leeks the experienced man says, "This will not be worse, but it is not good." But if the flavor is from dirt, he will know it, and he will class it as a "stinker," and that is a cheeee that no one will knowingly put their money into, for decomposition has set in, and it will get worse from day to day. This class of cheese is the very worst that can be sent to the old country. Sour cheese is not desirable, but it will never get worse and they will buy it. But they will not take stinking cheese, for they know it will spoil on their hands. The gas-bearing bacteria are opposed to lactic acid, and will not work with it; and it is a good thing for the cheese-maker that it is so. If your milk gets very bad from gas, it may thicken up and still be sweet. Such milk cannot be handled with the best results. We might use a good flavored starter, having a little more of the lactic acid germ than usual, and thus try to overcome the evil, and perhaps make a cheese that will sell fair when two weeks old or a month; but it will never make a first-class cheese for ordinary purposes. Now, it is in the farmer's own interest to see that he produces milk that will make the very best cheese. As I told you yesterday this cheese is your own. We have been looking at the wrong end of the thing. Some think that when they have sent their milk to the country they have gone as far as they should go. But the work has only started there. The cheese must be put on the market in its best possible shape. The cheese made from your milk may have been sold to Mr. Derbyshire, and Mr. Ayer, of Montreal, and may have got past them, but they have yet to go to the old country. The man there examines them, and he says, "This cheese is bad; look after that factory next time." The next year they examine your cheese very closely, and perhaps reject it, and thus you are in time very much injured on account of the poor milk sent in in the past. You must protect your own interests by seeing that all the milk sent to your factory is clean and wholesome. All the cheese sent to England must be fine, if we are to retain our proud position as the leading cheese country. If the man in England is pleased with your cheese he will say so, and will ask for more of it, and thus you will be bettered. You should aim to have this cheese bring the most money possible at the far end Do your part the best you know how, and see that the factory owner and the cheese-maker are also doing their part.

Now, a word to the makers. Are you paid in proportion to the work you do, and the way you do it? Some of you are, and some of you are not. It should be your aim to handle the milk of your patrons to the best advantage. See that patrons get proper instructions for handling their milk if they need such hints. If a man brings you in gassy milk, and you have twenty-five other patrons bringing in good milk you have a right—nay, it is your duty—to send that milk home. (Applause). If you do not send that milk back you are not doing the right thing by those twenty-five other men. If I were one of those other men, and knew that you allowed that gassy milk to go into the vat with my good milk, I would drop out, or see that you dropped out. One man's bad milk will spoil the milk of twenty-five or fifty others. You cannot make good cheese if one man only sends bad milk. You should know all about the milk Of course we take it for granted that you know all about salting, cooking and cutting curd, etc. But you should do your work so well that that factory will pay you $25, $50, or $100 more next year in order to keep you; or that another factory will offer you something better to go there. See that all the milk you receive comes in good condition, even if you have to

go to the man and talk to him yourself, and show him the way. If we go along these lines I believe the cheese made next year will be something that will bring us credit.

There has also been a good deal said this year about poor cheese, but in April, May and July we had first-class cheese, although some makers did turn out poor cheese even then. But it is a fact that a good deal of sour cheese was made during the year. Let me warn you about ripening cheese too fast. You gain nothing by making cheese rapidly. You should get back to setting in 20 to 25 seconds, and the whey will come off just as soon. You will be keeping your curd a little longer in the whey, but that will make little difference as to time, and there will be an improvement in quality. If you ripen too low it means that you have kept the milk too sour, and the danger is that you will not get enough acid out of the curd, and the cheese will be acid cut.

In the latter part of August the weather was very warm and quite moist and trouble commenced. I went through this section, and found that the cheese were not fine. Of course a few makers did really well, but much of the cheese was poor. The milk was coming in over-ripe. What was the remedy? It was simply to have the temperature lowered at home on the farm. We advised having the milk so cooled while on the farm that it would come to the factory in sweet condition. In both August and September much of the milk came in in bad condition where not cooled at home, and the quality of the cheese suffered in consequence. If you have not enough water keep the milk in small quantities, and it will soon cool to the prevailing temperature. Have an extra pail, and pour the milk two or three times from one pail to another. Then hang the pails of milk in the pure air outside, where the cats cannot reach them. Aerating milk will not take the gas out of it.

Cheese are only half made when put on the shelves They have to be cured; and if they are cured at a high temperature, and are seeded with bacterial forms, gases will develop and open the cheese up, and the cheese will get off flavor. Even if well made and close and tight, they will be apt to be off flavor, and the maker is asked to pay the difference. Is that right? No; not if he has instructed his patrons. If he has not done so, then he is largely to blame. If cheese is made loose and weak in body, the maker is to blame; but if he has made the cheese carefully, and they are off flavor, and he has kept his factory clean, then he should not have to pay for it. (Applause). He should pay only for his own carelessness or lack of knowledge; and the patrons should pay for their delinquencies.

We want soft cheese. Good cheese should break down in the proper way and at the proper time, should be silky in texture, with a nice, nutty flavor, and should have the quality of easily digesting in the stomach. Now, watch the markets. If you are making soft cheese, and the market is slow, make firmer cheese. Cure these cheese, and keep them until they are safe to leave your hands Your reputation is at stake, and if immature cheese is sent to Montreal or anywhere it is not fair. If I was a maker at a regular factory I would not let the cheese go out until it was fit, no matter what the patrons or the salesman said, unless they would agree to take all the responsibility off my hands. (Applause). If they insisted on sending cheese every week, I would see that it was at least two weeks old. Cheese should not go to Montreal with the collars sticking out, badly finished in any way, with the head cloths off, or with the boxes broken. Have the whole thing looking at its best. Be a neat maker. Standing collars are not fashionable on cheese. (Laughter). They are breeding places for skippers. All these defects get shown up sooner or later, and to the cost of all concerned in the factory.

The Government has done a lot for the country. They have published bulletins on the care of milk, and these bulletins may be had for the sending. Now I believe that two-thirds of the people know how to send good milk if they would just do as well as they know how. When the maker goes to his factory this spring the first thing he should do is to call a meeting of his patrons, and speak to them on the care of milk. If possible he should get a man of some standing to assist him in giving counsel of a practical sort. The makers in forming another body may have made a wrong move, but I think they really aim to do what is best for the interests of this Association. Let us give them the credit of good intentions. I would suggest that a committee be formed by the new association to meet with our Executive for counsel and co-operation. We cannot do without one another in this Association. I would advise that makers get a weekly card out, stating the condition of milk on the various day of the week, and also with hints on

the back as to the care of milk. This card would give them the weights of their milk, its condition, and any other fact that would be of immediate importance.

Mr. NEWMAN: But would that not add to the expenses of the maker?

The PRESIDENT: If any of the makers want to meet this Board at any time, we shall be happy to see them. We went to Stirling recently, to meet a number of makers, and we had a great time there. They actually gave us a banquet in the evening attended by 300 persons. The minute we heard in an informal way that the makers wanted a representative on this Board we gave them the man they named. No association has done for the dairy business what this one has done. Governor Hoard has said that of all the men he has met with to talk over dairying matters none have equalled the patrons, makers, and dealers forming this Association. We are proud of what our cheese-makers have done for the trade, and we have given them recognition. We have had most of our time during the day sessions given to the discussion of the making of cheese, or to matters closely associated with that phase of the work. But our aim is to have the Association thoroughly rounded out, so that all interests will be represented, and given due prominence in every way. This Province has led the world so far as cheese making is concerned. When we went to Chicago we cleared everything before us. We got 95 per cent. of the awards for cheese competing against the world. (Applause.) We made the biggest cheese ever built in the world, and in a factory within twelve miles of this place. We went down to Mr. VanHorne, of the C P.R., and put the proposition before him, of building a special car to carry that mammoth cheese to Chicago. The railway magnate sat on the desk, and swung his feet in a way that showed he was thinking hard. Then he said to us, "Gentlemen, where does the C.P.R. come in?" Prof. Robertson said, "We will make the name of the C P.R. famous throughout the world in connection with it." VanHorne saw the importance of the thing, and he gave orders for that car to be built, costing $20,000, and the monster cheese was brought to Chicago. Thousands of people saw the car and the mammoth cheese, and both the Canadian Pacific Railway and the dairy industry of this Province were well advertised. When we first held our Conventions we had perhaps thirty persons present, and hardly a newspaper man to give us a report; now we have a large number of reporters here ready to seize every good utterance made. If possible next year we shall have a four days' meeting—one for cheese, and nothing else; another for butter only, etc.

A MEMBER: I would like to ask Mr. Publow whether it is possible to feed rape or turnips so that they will not produce their flavor in the milk. I know some good farmers who contend that you can. I have made cheese for thirteen years, and I never knew a farmer who could produce first-class milk from turnips or rape.

Mr. PUBLOW: If you pasteurize such milk you can get over it to a certain extent for butter; but in cheese we cannot get rid of the taint so far as I know. If a man send milk with a turnip flavor to your factory, my advice is to make him take it back, or see to it that he becomes responsible for any cut or other loss in that lot of cheese. (Applause.) When I made cheese a man would say, "I do not like to take the milk home." I would say, "I cannot stand any loss. If you will become responsible for it then I shall retain the milk." Then I would ask him to sign a paper to the effect that he agreed to take the cheese made that day at market price, and that if anything happened to the milk to reduce the price of the cheese he would pay for it. I never got a man to sign that agreement. Do not ask a man to do an impossibility—to make cheese out of ill-flavored milk. Have no milk that has the taint of rape or turnips. I never feed turnips to cows. Some people claim that they can do so with no bad effect in the case of milking cows, but I do not think it can be done. We do not object to your feeding anything that does not produce an objectionable flavor in the milk. If you find that you can feed turnips safely, then do so; I would not try it myself. But if you have your milk sent back do not kick.

A MEMBER: I fed turnips for years, and got first-class butter.

Mr. PUBLOW: The turnip tops are worse than the turnips themselves. It always turns out when we investigate to fix the responsibilty that the cows broke into the fields. Send back milk with any turnip flavor every time.

FIRST PRIZE ESSAY ON HOW TO MAKE CHEESE.

By R. W. Thompson, Springbrook, Ont.

The successful cheesemaker of the day must not only have a thorough knowledge of the art of cheesemaking, but his knowledge must extend to the production and care of milk. He should be genial in manner, and possess great tact and judgment, that he may advise and instruct his patrons as occasion may require, without giving offence, thus securing their confidence and co-operation.

It is our purpose in this article to deal particularly with cheesemaking in detail. Yet the first requisite of good cheese is pure milk of good quality, and as this can only be obtained from healthy cows with proper surroundings, we will leave the cheesemaker for the present and begin with the farmer

The day has gone by when the only qualification a farmer needed was plenty of muscle and application, when his social standing was estimated by how willingly he seized the big end of the log at the logging bee, etc.

All this is past, and as civilization advances and population increases, and the natural fertility of the soil is reduced, it becomes more and more necessary that the farmer should be an intelligent, well-read man. While muscle is still a desirable quality, application and brains are what tell in the end. And as dairying or mixed farming is the best means of keeping up the fertility of the soil, the successful farmer must be a successful dairyman.

No farmer can order the climate to his liking, and few can have their farms located as they wish, or the kind of soil they most desire. He must be able to adapt himself to circumstances, as no set of fixed rules will apply to every farm. If his land is high and dry it will be necessary to provide green crops for his stock in summer. If low, damp soil, which produces abundance of grass, it may not be necessary or profitable to do so. If there is pure running water, so much the better. If not, it should be provided by means of tank and windmill, as dairy stock should have free access to pure water. Bad water will affect the health of the animal as well as the quality of milk produced. It is a safe rule to never allow or compel your stock to drink water which is unfit for human consumption. Stables should be warm and light, with plenty of space and good ventilation. The mangers should be fitted with water buckets and pipes, so that stock can be watered without leaving the stables in cold and stormy weather. In breeding or selecting a dairy cow it should be borne in mind that she is simply a milk-producing machine and the object is to secure the one that will produce the most and best quality of milk with the least expense. Do not keep a poor cow. Weed them out, or they will consume the profits of the good ones. The kind of food to use will have to be determined by the cost of production in the locality. Turnips or anything that will injure the flavor of the milk should not be fed. The food should be of good quality, and while we advise liberal feeding, care must be taken that the cost of food does not exceed the benefit derived from it. Many a farmer who is a liberal feeder, and whose herd produces a large flow of milk, is a loser in the end through his lack of knowledge of the milk or fat-producing qualities of the food consumed. The feeding of dairy cows is too large a subject to be dealt with here, but every farmer should study the matter for himself by practical experiments and reading of dairy papers.

The dairy cow should have free access to salt. She should be handled in a gentle manner. The use of dogs for driving cows should not be permitted. Anything that excites the cow reduces the quantity and injures the quality of the milk.

Milking should be done at the same hour night and morning, and by the same person. A soft cloth should be used to remove any dirt which might fall in milk pail. Wetting of the udder should be avoided Great care must be taken to keep all dairy utensils perfectly clean. After using they should be washed with warm water, then scalded with boiling water. Whey from factory should never be put in milk cans. Milk should be aerated and cooled to the temperature of the atmosphere, and kept away from any bad odors arising from hog pens or any other foul matter, and should be delivered at factory early in the morning.

Next in order is the factory, which should be in a central location, and be supplied with abundance of pure water and good drainage. It should have solid foundation, perfectly tight, hardwood or cement floor, with proper slope and gutters for carrying off whey

and water. The walls should be double, with air space between, and have double doors and windows. It should be equipped with modern utensils and machinery. The boiler should be large, and well bricked in, and plenty of space in boiler room. And if engine is used, it should be in separate room. The curing-room should be supplied with steam heat, also with means for cooling in hot weather, either by ice chamber overhead on the cold storage plan, or sub earth duct, or other modern methods, as the temperature of a curing-room should always be subject to the will of the cheesemaker.

The whey tank should be elevated, and have water and steam pipe connections, and should be thoroughly cleaned at least once each week.

We will now return to the cheesemaker. Taking it for granted that he thoroughly understands his business, it is also very important that he should be honest, cleanly, careful, and thorough in all his work. There is more cheese spoiled by neglect and carelessness, and the desire of the cheesemaker to hurry the process, than by lack of knowledge. He should give his personal attention to weighing and testing of all milk, and reject any that is not in proper condition. Many farmers have the opinion that any milk which is not sour, is fit for cheese. This idea should be speedily removed by the cheesemaker rejecting all gassy or ill-flavored milk. Steam should be turned on vat while milk is being received, so that the temperature of milk will be 86 degrees by the time the vat is full. A rennet test should then be made to ascertain the acid condition of milk. This is done by taking eight ounces of milk in a glass, and putting a small bit of wood or cork as an indicator, and stirring for ten seconds If the milk is ready for rennet, the indicator will suddenly stop in about 20 seconds, but this will vary according to time of year and strength of rennet, and condition of milk. If found to be too sweet, a starter should be used to develop acid, care being taken to have the proper kind of starter. A good one can be made by taking a small quantity of pure milk, free from gas or bad flavor, and allow it to sour. Then take the quantity of milk likely to be required as starter the next day, and heat it to 160 or 170 degrees, keeping it well stirred while heating Then let stand half an hour ; then cool to about 65 degrees, and add about three per cent. of the milk which has been previously soured ; set in a cool place, and it will be sour and ready for use the next morning. Save about three per cent of this to add to starter for next day. Never use starter before rennet test has been taken unless weather is cold and milk known to be very sweet. If milk is of good flavor, and will set in from twenty to forty minutes without the use of a starter, it is advisable to wait. But if milk is bad or gassy a good flavored starter will improve it.

If colored cheese are being made the coloring may be added any time after weight of milk is known. Dilute the coloring in a dipper of water, draw the dipper with the coloring in underneath the surface of milk from end to end of vat and stir thoroughly. Rennet test should be taken very frequently or milk may become over ripe. It should be ripe enough before the rennet is added as to be ready to dip or remove the whey in two and a half or three hours, with from $\frac{1}{8}$ to $\frac{1}{4}$ inch of acid by hot iron test. In spring when quick curing cheese are required use from three to five ounces of good rennet extract for one thousand pounds of milk, and two and a half to three in summer and autumn. Stir the milk thoroughly for about three minutes after adding the rennet. In spring it should start to coagulate in about eight minutes, and ready to cut in about twenty minutes, and in summer about thirty minutes. In cutting the curd care must be taken to cut it even and not bruise or break it, as this allows the butter-fat to escape and will reduce the average. Cut first with the horizontal knife, and then crossways with the perpendicular, then lengthways with the same. Stir carefully by hand for about fifteen minutes before turning on steam ; then heat slowly to 98 degrees, keeping it well stirred while heating, and also for about fifteen minutes after steam has been shut off. Stir quite frequently afterward, to prevent curd from matting on the bottom of the vat. When curd shows $\frac{1}{8}$ of inch acid by hot iron test, or $\frac{1}{4}$ in summer, draw off the whey, and if sink is used dip the curd into it and stir until quite dry. When dry enough pack it about five inches thick in end of sink or vat, as the case may be, and allow it to mat. As soon as it will adhere together cut in strips about five inches wide and turn it over. It should be turned every few minutes, and if moisture is well removed it may be cut crossways and piled two or three deep, or even higher. When it becomes flaky, and shows from one to one and one-half inches of acid by hot iron test, put through curd mill. Stir for about fifteen minutes after milling, and every few minutes until ready to salt, which will be as soon as it be-

comes mellow and fine in texture and of a smooth appearance, something like newly made butter. Use about two pounds of best dairy salt in spring, and two and a half to three pounds in summer, to every thousand pounds of milk. Salt must be free from lumps. The best plan is to salt with a sieve, and apply about one-third of the amount, then stir, then add another third and stir again, then add the balance and stir thoroughly. Allow temperature to lower to about eighty degrees, and put to press about half an hour after salting.

Cheese should be made of uniform size. This can be done by the same party fill all the hoops, or better still, by weighing the curd put in each hoop. Press lightly at first, and when whey flows freely let them stand a few minutes and then press again. Repeat this every few minutes for one hour. They will then be ready to bandage. The bandage should be of proper length, so that there will be one inch turned over each end of cheese. Cheese should be turned in the hoop in the morning to give a better finish. Cheese should be left in press until hoops are required next day or if press room permits, for two days.

The proper curing of cheese is very important and requires a great deal of attention. The curing-room should be at a temperature of about 65 degrees. The cheese should be turned over every day until they are at least two weeks old. The curing-room should be moist but not moist enough to cause mould on cheese.

When preparing cheese for market weigh carefully and mark the weight in plain figures on the box. Use only boxes that properly fit cheese, and cut down top of box about one-quarter inch below surface of cheese so that the lid will rest on the cheese. This will prevent the breaking of boxes in shipping, or when cheese are piled high on top of each other. Oil cloth covers should be provided for waggons while delivering cheese to shipping point, so that they may be kept clean and dry. No article of this kind or any set of fixed rules can ever make a successful cheesemaker. He must have long practical experience, quick judgment, and good common sense for as the condition of weather and milk varies from day to day, he must vary his methods to meet the conditions.

But before closing we would advise when acidy or over-ripe milk has been received to set at lower temperature and use more rennet. Cut curd finer, cook faster and higher, and dip as soon as curd is firm enough to permit, and stir drier. It is sometimes necessary to wash curd in sink to remove acidy whey. This can be done by pouring over it water which has been heated to about one hundred and two degrees, and stir well. Mill early and use more salt and allow it to stand one hour or even longer before putting to press.

For gassy milk use more starter than usual, and do not cook quite so high, as the more moisture there is left in curd the faster acid will develop and kill the gas. Stir and air well after milling and give more acid before salting.

In conclusion I would say, accept only good milk, for the old saying still holds good, "An ounce of prevention is worth a pound of cure."

FIRST PRIZE ESSAY ON BUTTER-MAKING.

By J. W. Newman, Brockville, Ont.

It is with a great degree of pleasure that we look upon the growth of our butter exports the last few years and especially, when we consider that this growth is due to improved quality. Butter-making from the standpoint of the dairy farmer, whether it be in the creamery, or at home, is surely a business of rare chances. There is no business, whereby the farmer can make as much money with so little fertility taken from the soil, as in butter-making. It has been said that butter comes from the air and sunshine, and just think, how plentiful they are, and how little they cost.

One great point of economy, is that all butter should be made uniform, and good. It costs just as much to make poor butter as good. Canadian dairymen should climb to the top in the quality of their butter, and then in a larger measure than ever, they could send out their sunshine and their skill in exchange for English sovereigns. This would keep them out of competition with cheap labor, in eastern countries, in grain production. Shipping only concentrated food would save paying freight on the carrying away of land fertility.

The real food value of butter is not much more than tallow, which can be bought for 3 cts. per pound, and is only more valuable because of its more agreeable taste and its softness, which makes it especially suited for spreading on bread, etc.; hence, we see the great importance of flavor, which has the greatest influence on the market value of butter.

Butter is more complicated in its chemical composition than other fats, having a combination of about fifteen different fats; thus it is easy to detect fraud in false butter.

The two most important points to be observed in buttermaking are cleanliness, and proper temperatures. To make the score run high, the first requisite is the very best of raw material. That means milk from good healthy cows, which have been fed wholesome, good flavored food, and which have had only good pure water to drink. Even yet this milk may deteriorate in flavor by filth falling into it, by absorption, or by bacterial development which may produce injurious flavors. Hence we see the necessity of cleanliness in milk production. Brush the side and udder of the cow in order to prevent filth from falling into the milk-pail. Milk with clean dry hands and remove as soon as possible to a place where the atmosphere is pure, and have it immediately strained.

Cream may be taken from milk by three methods, viz: shallow pans setting, deep settling with ice, and by the use of a centrifugal cream separator.

The centrifugal method, however, is now the only method used in creamery work and even in most good dairies. There are many different makes, but the same principal is involved in all, though each manufacturer claims some particular points of merit.

Any separator should be placed on a solid foundation and levelled. If a belt separator, intermediate should be set in line with drive shaft, and far enough away from separator to insure proper distance for endless belt. The right hand perpendicular face of intermediate pulley should be in line with right hand side of spindle pulley. The intermediate should turn away from separator, and thereby carry part of the weight of the bowl, which lessens friction on the lower bearing. The lower side of intermediate pulley should be level with the centre of spindle pulley, if round belt is used, but if a flat belt, one-half inch above the centre. The best way to start a belt separator is to start with engine and increase slowly together.

Milk fresh and warm as it comes from the cow is in the best condition for separation. If it can't be separated then it is best to aerate and cool to 60 degrees. When ready to separate, heat the milk again above 90 degrees by some continuous heater that will hold sufficient milk to keep separator going, at least, five minutes. Butterfat is not a good conductor of heat, not equal to milk serum, therefore sufficient time for expansion of the fat should be allowed before milk is fed into separator.

Milk is heated to reduce its viscosity. This increases the capacity of the separator, and insures more exhaustive separation.

Unfavorable conditions for cream separation are: (a) Speed below that which the machine is calculated to run. (b) Feeding separator to its capacity or over when speed is too low. (c) Milk below a temperature of 84 degrees when being separated. (d) Making very heavy cream by adjustment. (e) Vibrating, swaying, or unsteady running of the bowl.

Reversing these conditions, of course, will cause the most favorable conditions for thorough separation. Every butter-maker should see that his separator runs smoothly, and with regular speed, and that, as near as possible, to the speed intended for that particular machine, which is usually stamped on the bowl. It is not wise to run any separator much faster, owing to the danger of injuring the bearings, or bursting the bowl.

Adjust so as to make from 25 to 30 per cent. fat in cream. It is advantageous to make thick cream, as there will be less volume of cream to handle, therefore requiring less ice. The churning also can be done in less time, and at a lower temperature. This will make firmer butter and more exhaustive churning.

As soon as separating is completed the separator should be thoroughly washed, getting every particle out of the crevices, and then have it thoroughly blown out with live steam, so that all parts coming in contact with milk or cream will be perfectly sterile. The heat absorbed by the bowl will then cause all dampness to vaporize, thus leaving all parts dry and free from danger of rusting.

Immediately after separation the cream should be cooled down to about 70°.

Always have ready a good pasteurized, skim-milk starter to put into cream when the separator commences, to begin the desired fermentation, and to overcome the evil effects

of any injurious forms of bacteria that may have been in the milk Cream is ripened to improve the yield, flavor, and keeping quality of the butter. A good starter is a boon to successful butter-making. It hastens the development of lactic acid, allows the cream to be ripened at a lower temperature, and to a great extent controls the flavor of the butter. It is important that the starter has a good flavor.

There are, very kindly sent out and upon easy terms from the Bacteriological Laboratory at Guelph, pure cultures for the making of starters for butter-making. This should be added to a quantity of pasteurized skim-milk, to which has first been added about 15 per cent. pure water. (All cans, dippers, etc., used therewith should have been perfectly sterile). Keep covered and undisturbed at a temperature of about 75° to 80° until time to use. Skim off the first two inches from the top and thoroughly break up by pouring from one can to another ; strain before adding to the cream. If this starter is in good condition a portion may be used to start the next day's starter, and so on from day to-day until it becomes contaminated.

Should the starter go wrong from any cause a fresh one may be started from the buttermilk of a lot of cream that was ripened in good condition, and that produced good flavored butter.

The quantity of starter used must be governed by the ripeness of milk, the time allowed for the cream to ripen, and the temperature at which it is ripened. As soon as the cream commences to thicken (which should be in about four hours after adding the starter) be ready to cool quickly to at least 55° temperature before leaving it for night and then the churning is ready any time in the morning.

Sufficient lactic acid should be developed in the cream to cause coagulation in at least six or eight hours before churning.

Always stir the cream frequently while ripening to ensure uniformity.

Properly ripened cream will have a smooth, glossy appearance. Is will pour like thick molasses, and have a pleasant acid taste and smell, and with the alkiline test will show from .45 to 7 per cent lactic acid, according to its density or per cent. of butter-fat.

In Denmark, nearly all the milk or cream for butter-making is pasteurized, and, in fact, that process is rapidiy gaining favor in Canada, especially at certain seasons. This, with the use of a good starter, gives the maker full control of the cream ripening, as it leaves, as it were, clean soil to grow the desirable bacterial forms.

Churning.

Prepare the churn by scalding, followed by a liberal amount of cold water to cool it. The cream should be colored so that the butter will suit whatever market it is prepared for. The cream should be at its proper churning temperature at least two hours before the churning is commenced. This will secure a firmer body and a better texture in the butter.

Churning temperature will vary according to the season, the time the cows have been in lactation, and the per cent. of butter-fat in cream. It should always be arranged to have some cows fresh in milk at every season.

Other things being normal, and the cream having from 25 to 28 per cent. fat, churning should be done at 53° to 55° in winter and 48° to 52° in summer.

Slow churning is caused by :

(*a*) Too thin cream—make richer cream.

(*b*) Churn too full—one-third full is sufficient.

(*c*) Temperature too low.

(*d*) Cream not sufficiently ripened.

(*e*) Churn running too fast or too slow.

(*f*) Putting in too much cold water, too soon after the butter begins to break. If the butter forms into small round smooth granules, and does not seem at all inclined to gather, draw off a portion of the buttermilk. Taking the right amount will cause the butter to gather as desired. Sufficient water at churning temperature, or slightly below, should be added to every churning, to prevent it breaking too quickly and gather in large lumps before the cream is thoroughly churned. If this added water makes the gathering too slow draw off buttermilk as described above.

Churning should be done in 30 to 40 minutes. Run churn at from 50 to 60 revolutions per minute according to diameter. The granules should be a size larger than plump wheat grains, and if the first buttermilk drawn shows little particles of butter, continue churning a few more rounds.

Washing the Butter and Salting.

After the buttermilk has thoroughly drained off, wash the butter in a liberal amount (nearly equal to the volume of cream) of water at a temperature just a shade below churning. If a second washing is necessary less water will be required. By using water colder than the butter it will prevent the particles adhering to each other while the salt is added and thoroughly mixed throughout the granular mass while in the churn. Let the butter remain in the churn, or place in boxes or tubs, for three or four hours where the temperature is low. Salting this way requires less working to make an unmottled butter, and improves the texture and grain. A little extra salt should be used. Use only some especially prepared butter salt which has been kept clean and free from offensive odors. The amount of salt to use will depend on the market. Canadian markets require from $\frac{3}{4}$ to 1 oz. per lb. of butter while British markets require only from $\frac{1}{2}$ oz. down to saltless butter.

Care should be taken while handling or working the butter not to injure the grain, by over-working, or working while too warm, or too cold, or allowing any spade, etc., to draw or slide over the butter. Salt should be distributed evenly and butter worked sufficiently to give it an even color.

Packing.

For the Canadian markets the majority of grocers prefer one pound prints as they can be handled without loss in cutting, and therefore they can pay a higher price for them. The parchment paper should be of good quality having the name of dairy or creamery neatly printed on, and tastefully arranged. At certain seasons there is quite a demand for small sized tubs. For export, however, the 56 lb. box is the leader. It should be coated with paraffin wax inside and then lined with parchment paper. Soak the paper a while in brine and a solution of formalin to prevent mould.

Pack the butter well in the centre of the box first to drive out the air, and then pack well in the corners and as firm as possible all the way up, not putting too much in the box between the times of packing. Try to pack the butter so that when it is turned out of the box it will look close and solid. Put one pound extra into box to insure the weight holding out. Butter should be shipped regularly and very soon after being made. Use plenty of ice, and if possible keep below freezing point until on the consumers' table.

Be careful and particular in the details, and the business will prove a successful one.

VOTES OF THANKS.

Upon motion of Mr. Kidd, seconded by Mr. McTavish, the thanks of the Convention were tendered to the Mayor, aldermen, and citizens of Smith's Falls for their hospitality and kind treatment of the members of the Association.

Mayor Farrell made a brief reply, in which he expressed the pleasure it gave the citizens to receive the Association, and the benefit resulting to all concerned from the visit.

It was also moved by Mr. Eager, seconded by Mr. Whitton, that "The thanks of the Association are due and are hereby tendered to the railways that have given us reduced rates, thereby enabling us to return delegates to their homes free of cost." Carried.

The Convention adjourned after singing "God Save the Queen."

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

OFFICERS FOR 1901.

Honorary President.—Hon. Thos. Ballantyne, Stratford.
Honorary Vice-President.—John Prain, Harriston.
President.—R. M. Ballantyne, Stratford.
1st Vice President.—Aaron Wenger, Ayton.
2nd Vice President.—James Connolly, Porter Hill.
3rd Vice President.—J. N. Paget, Canboro.

Directors.

District No 7.—W. T. Petrie, Holstein.
District No. 8.—Harold Eagle, Attercliffe Station.
District No. 9.—Robert Johnston, Bright.
District No. 10.—Geo. H. Barr, Stratford.
District No. 11.—A. F. MacLaren, M.P., Stratford.
District No. 12.—John Brodie, Mapleton.
District No. 13.—Geo. E Goodhand, Milverton.

Representatives to Industrial Fair Association, Toronto. R. M. Ballantyne, Stratford; Harold Eagle, Attercliffe Station.

Representative to Western Fair Association, London. T. B. Millar, London; J. R Isaac.

Auditors.—Col. Hegler, Ingersoll: J. A. Nelles, London.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

ANNUAL MEETING.

The thirty-fourth annual convention was held at the city of London, January 15, 16, 17 and 18, 1901. The meetings were held at the London Opera House, the Auditorium, and the City Hall. A large exhibition of butter and cheese was held at the City Hall. The room was very neatly and tastefully decorated with palms, flowers, etc. Quite a number of local farmers and citizens took an interest in the meeting, especially in the butter and cheese exhibits.

The Convention from start to finish was a thorough success, and the Dairymen of Western Ontario have much to be proud of in connection with their first Convention of the twentieth century. The only regrettable feature was the fact that the President, Mr. R. M. Ballantyne, was unable to be present, being confined to his home through illness. His place was ably taken by the first and second vice-presidents, Mr. Aaron Wenger and Mr. James Connolly.

Mr. JAMES CONNOLLY, in taking the chair and calling the meeting to order, said: I am sorry to inform you that our efficient President is sick and unable to be present with us, and that, as I am one of the vice-presidents, it falls to my lot to fill the chair. I am very pleased indeed to have the honor of opening your first dairy meeting in the twentieth century, and am also pleased to have the honor of opening this first meeting of the amalgamated associations. I am pleased, indeed, to see that the two associations are now one, because our interests are one, and we are striving for the same end. I have great sympathy with the cheesemakers and with the buttermakers, and I hope they will get every satisfaction from the amalgamated associations. Although I am not a very hard working man myself, I have great sympathy for the man who rolls up his sleeves and does the work he has to do to the best of his ability. Our cheesemakers who do their very best to make the article that the markets of the world demand deserve great credit, and to them a great deal of credit is due for the high standing our cheese has attained in the market of the world. I hope they will continue to protect their products until Canadian cheese will have a reputation better than any other cheese manufactured on this earth.

DIRECTORS' REPORT FOR THE YEAR 1900.

The directors of your Association for the year 1900 submit the following report:

1. By an Act passed at the last session of the Legislature the name of your Association has been changed again from the "Cheese and Butter Association of Western Ontario" to the Dairymen's Association of Western Ontario," a title which is more comprehensive and more fully describes what the Association is.

2. The output of cheese and butter has, though not in some localities, been considerably larger than it was during the year 1899. In this respect the year has been more profitable to the cheese and butter makers. This larger yield, coupled with the extremely high prices ruling during the season, has made the dairy industry, so far as it has affected the patrons, a prosperous one. On the whole, the directors feel they have reason to congratulate both makers and patrons on their year's business, though there have been some drawbacks the causes of which will doubtless be brought out during the discussions.

3. The report of the proceedings of last year's convention, and also of that of the Cheese and Butter Makers' Associations convention, were printed and issued by the board. The expense of issuing these was moderate, and it is recommended that the same be done again.

4. The directors laid down the work of instruction on the same lines as has been in operation now for several years past, but they were able on account of being in a better position financially to reduce the proportion of the cost to be paid by the factories for the

services of the instructors from $5 per visit to $3 per visit, with $2 per day for each day over one where the visit was of more than one days' duration. We have reason to believe that these charges were satisfactory, and trust that the financial position of the association will continue to be such that they will not be required to be increased.

5. The objects of the directors in establishing the Experimental and Illustration Station at Milverton were:

(*a*) To conduct experiments in the making of cheese under the same conditions as the cheesemakers have to contend with in the ordinary cheese factory, and at the times of the year when the cheese is usually made.

(*b*) To illustrate how an old factory, not in very good condition, can be improved and brought up to modern standards at a comparatively small cost.

(*c*) To illustrate by practical use the method of disposing of the washings from the factories on the plan recommended by Prof. Bryce, the Provincial Health Officer.

The report of the Superintendent will show to what extent these objects have been attained.

6. At the request of the Commissioner of Agriculture and Dairying, Ottawa, (Prof. Robertson), your directors caused a selection of Western Ontario white and colored cheese to be made for exhibition at the Paris Universal Exposition, and have much pleasure in reporting that the exhibits were so satisfactory that the Association has been awarded a Grand Prize diploma.

Your directors paid for the value of these cheese, the other expenses being paid by the Department of Agriculture, who were also to reimburse the Association for their outlay. They have not yet been advised whether this re-payment will be made or not. The matter will be referred to the board of 1901, so that if it is received the amount will appear among the receipts for next year.

7. The Department of Agricultural, Ontario, has been advised by the Superintendent of Dairy and Agricultural products at the Pan-American Exposition, that, though no formal application has been made, some space is being reserved for an exhibit of Dairy products from Ontario.

8. The usual grants were made to the Industrial Fair, Toronto, and to the Western Fair, London, but with the grant to the Industrial Fair a condition was made that the amount would only be paid if buildings for the exhibition were provided satisfactory to your representatives. These conditions were not complied with, and therefore the the grant was not paid over.

9. The Legislature of Ontario made a special grant of $750 to the Association for extra work, and this amount has been applied towards the Experimental and Illustration station work that has been carried on at Milverton, and towards providing for the prizes and expenses in connection with the Winter Dairy exhibition now being held under the auspices of this Association.

10. An agreement was made with the Cheese and Buttermakers' Association by which the assets and liabilities of that association were transferred to your Association and then the Cheese and Butter Makers' Association ceased to exist. Your directors appointed a committee consisting of Messrs. T. B. Millar, G. H. Barr, John Brodie, M. R. Brown, and W. W. Harris, to carry on the work that has been so successfully done by the makers' association, and especially the promotion of the Winter Dairy Exhibition. Committees such as these, the members of which are not necessarily members of the Board, can be of great use, inasmuch as while the Board does not transfer any of its responsibilities, the committee can give its undivided attention to the special work intrusted to it. The Winter Dairy exhibition is now being held in the City Hall, valuable prizes have been offered for butter and cheese, for which forty makers have entered in competition, whose names and addresses are attached herewith.

11.—Programme—An excellent programme has been arranged for the various sessions of this convention. Subjects of vital importance will engage your attention.

All of which is respectfully submitted.

JAMES CONNOLLY,
Vice-President.

Moved by Mr. CONNOLLY, seconded by Mr. A. F. MACLAREN, M P., that the report of the directors be received and adopted.

Mr. BALLANTYNE: I will move an amendment that it be laid on the table for the present. It refers to some very important matters which will admit of discussion at some future time, and there may be an opportunity during the meetings of the Convention to discuss these matters, and for that reason I move that it be laid on the table in the meantime, instead of being adopted.

The amendment was seconded by Mr. J. N. PAGET, and was carried.

FINANCIAL STATEMENT FOR THE YEAR 1900.

RECEIPTS.		PAYMENTS.	
To Cash from 1899	$1,037 37	By grants to other societies, fairs, etc ...	$ 50 00
" Membership fees	158 00	" Cash paid for prizes (Essays)	200 00
" Municipal grant, Stratford	200 00	" Convention expenses $476 54	
" Legislative grants	4,000 00	Less advertising 169 55	306 99
" Money for prosecutions	194 51	" Officers salaries, Secretary	360 00
" Instructors' fees from factories and creameries	720 00	" Directors and Committee meetings ..	253 65
" Cheese and Butter Makers' Association	119 47	" Postage, telegraph & telephone. $61 77	
		Stationery 49 88	111 65
		" Printing annual reports	177 60
		" Advertising	10 00
		" Judges expenses	10 00
		" Instructors, salaries and expenses .... (James Morrison, $983.51; John Brodie, $643.00; George McDonald, $492.00; Arch. Smith, $671.00.)	2,789 51
		" Instructors' supplies & extra travelling	27 35
		" Reporting	70 00
		" Experimental and Illustration Sta.:	
		Fitting up $300 00	
		Superintendent 300 00	600 00
		" Paris Exposition exhibits ..	53 88
		" Industrial Fair attendance	34 80
		" Auditor's fees	8 00
		" Cheese and Butter Makers' Associa.:	
		Prizes $150 00	
		Travelling expenses 52 50	
		Refund to members 86 00	288 50
		" Exchange on express orders	3 73
Total receipts	$6,429 35	Total disbursements	$5,355 66
		Balance on hand	$1,073 69

NOTE.—This amount has been reserved by the Board to provide for expenses being incurred for the current year, chiefly in connection with this Convention; for the prizes and expenses of the Winter Dairy Exhibition; and for the depreciation in the value of the cheese used for experimental purposes at Milverton, and which are now on exhibition at the City Hall, the depreciation amounting to $221.97.

PRESIDENT'S ADDRESS.

BY R. M. BALLANTYNE, STRATFORD.

I am pleased to welcome you to the 34th Annual Convention of the Dairymen's Association of Western Ontario, and I am especially pleased because the last year of the century just closed has been the greatest year for the producers of dairy products that Canada has ever seen.

The value of exports from Montreal alone was two and a half millions more than for any previous season, and to this must be added increased shipments from American ports.

This is also the first convention held by us since the amalgamation of the Cheese and Butter Makers' Association with this Association. The Makers' Association was undoubtedly carrying on a good work, but the work carried on by them was so similar to that carried on by this Association that there did not seem to be any reason why the two Associations should not be amalgamated; so, for the purpose of effecting this amalgamation, resolutions were passed at the last annual conventions of both Associations empowering the directors to carry out the necessary details, which was afterwards done to their entire satisfaction.

During the negotiations for amalgamation the directors of the Makers' Association suggested that we have a four day's convention instead of three days as formerly, and that the Winter Dairy Show, which had been inaugurated by them, be continued by this Association, to both of which suggestions the directors of this Association consented, so that this year we have for the first time a convention of four days duration, and a Winter Dairy Show in connection with the convention. We have with us at this convention the very best talent we could find, and we hope to make it the most profitable meeting that has ever been held by dairymen in Canada, so that we hope you will remain to the end.

The Dairy Show should be specially instructive. We will have a special meeting in the City Hall where the show is, and where the judges will talk to you of good cheese and poor cheese, and on the lessons to be learned from this exhibition. We feel that the class in which the August cheese are should be specially instructive, because these cheese were no doubt selected from the best cheese in the factories from which they came at the time they were selected ; and it will be very interesting to note the changes that have taken place in cheese that were considered 'finest' in September, but many of which will have developed characteristics that have taken them out of that class long ago. I know I am stating a truth when I say that bad flavor is the greatest difficulty we have to contend with in our cheese ; and I believe I am stating another truth when I say that the kind of flavor that gives us greatest trouble, and consequent loss of value, is the flavor that develops in the cheese after it is made. This flavor I understand to be a bacterial growth, caused by some objectionable form of bacteria getting into the milk after it is drawn from the cow, or by getting into the curd during the process of manufacture at the factory.

I will be surprised indeed, if we do not have some very pronounced specimens at this winter show, and I hope we may be able to learn the lessons they teach, that cleanliness is the all important point in the manufacture of cheese or butter. The objectionable bacteria may get into the milk at the time of milking, by falling from the cow's udder, by the milker dipping his or her fingers into the milk, or by proper care not having been observed in the cleaning of the utensils that come in contact with the milk ; but not infrequently I am sorry to say the cheese factory is a breeding ground of the most objectionable kinds of bacteria, and if they do not get into the cheese the cheesemaker is a lucky man indeed.

I am pleased to say this class of cheese factory is not general, but there are entirely too many that can be included, and if this exhibit will emphasize the necessity for greater cleanliness it will have performed its part. I felt that it would be a good thing if this Association would get up one set of rules, printed on cardboard to be posted up in a conspicuous place in the factory, for the guidance of the maker and his assistants, and another set for distribution among the patrons of the factory. I am told that some people would take offence at them, and I know that angry words do not convert sinners, but so long as we go about patting ourselves on the back, and fooling ourselves with the idea that we cannct accomplish much, if any, improvement, just so long will we fail to get all the benefit we might from the opportunities that are given to us. It is only within recent years that dairymen have commenced to understand anything about bacteriology and its relation to dairying, but now that the bacteriologists have come to our aid, we should not be slow to make use of them, and profit by the information we get from them. If you can get all the people who are engaged in the production of milk and its products to understand the extent to which foul bacteria may get into the milk from lack of proper precautions, and the rapidity with which they multiply after they are in, you will have accomplished a great deal towards the improvement of the product, and a list of rules such as suggested should be prefaced with this information.

Let our 20th century methods be better than our 19th century methods. Let everyone that has to do with the handling of the milk and the manufacture of cheese and butter realize that they are handling the most delicate article of human food, and we will march on to greater victory. (Applause)

REPORT OF INSTRUCTOR JAMES MORRISON.

I take much pleasure in presenting to you my fourth annual report.

DISTRICT. The district allotted to me was the same as last year, with the addition of the County of Waterloo, namely—the southeastern portion of Western Ontario, comprising the Counties of Oxford, Norfolk, Brant, Haldimand, Welland, Lincoln, Wentworth, Halton, Peel and Waterloo. In this district there are one hundred and twenty cheese factories in operation.

APPLICATIONS. Applications were received from forty of these asking for from one to eight visits each, as against applications received last year from thirty-three factories

TERM. I commenced my work for the Association on the 3rd of May, finished on 2nd of November, during which time I spent one hundred and five days at the factories with the cheesemakers, and three days attending to prosecutions.

MILK TESTING. In these forty factories I tested 10,602 samples of milk with the Quevenne lactometer, and 651 samples with the Babcock tester. At seven of these factories there was no Babcock tester, as compared with fourteen out of thirty-three factories last season. This doubtless accounts for the smaller number of cases to be proceeded against on account of patrons tampering with their milk. The knowledge of the Babcock tester being in use at the factory causes some patrons to act more honestly than they otherwise would

PROSECUTIONS. Information was laid against four patrons for tampering with their milk, who were fined $5 to $25 each and costs, amounting in all to $67.61. There were also ten other patrons that I discovered supplying adulterated milk to the factories, who acknowledged their guilt to me. They were assessed by the directors of the factory from $7.50 to $43 each in liquidation of damages to the factory. This amounted in all to $172 82, making a total in fines and damages in fourteen cases of $238.43

There is still a disposition on the part of some factory managers to screen their patrons who have been found tampering with their milk, for fear that their patronage might be transferred to a neighbouring factory. I am sorry to say that there are still some makers who will accept milk that has been objected to at another factory. So long as they continue to do this it will be almost impossible to get honest milk from all the patrons. In some sections tampering with milk is considered a very slight offence One patron when spoken to about having watered his milk said he did not doubt the fact; he supposed the water he had put in to cool the can had not been poured out before the milk had been put in. He said, "I do not feel badly about it. I do lots of mean things, but I am not mean enough to put water in the milk for any gain." I will guarantee that he never objected to the water in the milk being weighed as milk at the factory.

PAYMENT BY QUALITY. Three of the factories I visited are paying by per cent. of butter fat, as against two last year. This method is giving satisfaction to all parties concerned.

FACTORY BUILDINGS AND PREMISES. The condition of our cheese factories and premises is certainly improving. In some cases improvement is slow, but still there is some progress. Some factories which a few years ago where scarcely fit to make cheese in are now lined inside and painted or whitewashed; have new floors; gang presses have displaced the old upright presses that were so hard to keep clean, while the outside of many of the factories have now a much more attractive appearance. The curing rooms have in many cases been improved in several ways, and are in better shape to control the temperature in warm weather. The example set by those who are getting their factories into up-to-date condition will cause the others to follow or fall out of the race altogether.

CONTROL OF TEMPERATURE. For the purpose of controlling the temperature fifteen of the factories I visited were using ice and two had sub-earth ducts. The exceedingly warm weather in August was most trying on the cheese in most of the curing-rooms. At the factories where ice was used in large quantities the temperature was kept a little lower than where the sub-earth ducts were used, but in the two factories where the sub-earth ducts were used alone the cheese were scarcely affected by heat, nor did they show any mould on them at any time when I was in the factory.

I received information from a maker in another factory where the sub-earth duct was used that at the end of the third day of the extreme heat in August the temperature

had risen to 78 degrees; he then used some ice which lowered the temperature, and he had no further trouble. From what I have seen during the past season the sub earth duct, if properly constructed, is all right and has come to stay; but in extreme heat with calm weather ice can be used to advantage along with the duct.

WHEY Of the factories I visited, 33 returned the whey to the patrons in their milk cans, seven fed the whey at the factory or had it drawn away.

WHEY TANKS. This old vexed question will bob up serenely every year. There is plenty room for improvement at the top, especially in the case of the underground tanks, which certainly should be elevated. At some factories where the whey is returned the tanks are kept fairly clean, but the whey should be emptied from the cans as soon as they are delivered from the wagons. It is frequently left in them, not only till noon but often until night, when they are required for the evening's milk. In such cases it is no wonder that the cans are not in the condition they should be, and it is made worse by the tanks also if in a filthy condition as in some cases they are. Where tanks are elevated it is an easy matter to have them cleaned, for all that is required is a little extra work on the part of the cheesemaker or his helpers. Either of the tanks can be emptied at some time of the day to be cleaned, but if the tank is underground it is not so easy. They often go for weeks at a time without being cleaned. If at any factory these underground tanks cannot be done away with provision should be made to have them emptied and cleaned at least once a week. It should also be insisted upon that the patrons should empty the whey from their cans as soon as they are returned, and at once have them washed out clean, scalded, and left in the sun to air until needed for the night's milk. If makers and patrons would attend more closely to this duty there would be fewer complaints and bad flavors in the cheese.

QUALITY. There is one thing I am pleased to give the majority of makers I visited this season credit for, namely—the neat and tidy finish of their cheese when put upon the shelves. There are still a number who can improve a great deal in this respect, and who seem to think that any old way will do as long as the buyer does not object. The quality of the cheese this season has been fairly good at the time of shipment from the factories. The cheese in the early part of the season were shipped out within a few days from the hoops, too early, to ensure good quality when put on the market for consumption. In the latter part of the season the cheese were held longer in the curing-rooms, and in some cases developed flavors from apples, turnips, and other causes. There was also a bad flavor claimed by the makers to have been caused by "depreciation in price after the cheese was sold." The makers claim that something should be done to get rid of this bad flavor, but I am afraid it does not come within the duties of your instructors.

RECOMMENDATION. In my report last year I advised cheesemakers to visit their neighboring factories as much as possible, and I have noticed that there has been more of this visiting during the past season than formerly, and that it has had a good effect in stimulating makers to keep their factories clean and tidy. I advise every maker before starting his factory next spring to look back on the past season, and see where and in what way improvements can be made for the coming year and to have them done at the beginning of the season; then to do their best to keep everything in and about the factory clean and tidy during the season. By doing so they will be well repaid by the satisfaction it will be to themselves, to their patrons, to buyers, and to everyone concerned.

REPORT OF INSTRUCTOR JOHN ERODIE.

I herewith present my report for the season of 1900.

DISTRICT. The district assigned to me was the south-western portion of Western Ontario, comprising the counties of Essex, Kent, Elgin, and the portions of Middlesex and Lambton, south of the G. T. R. railway. In this district there are about one hundred cheese factories in operation. Owing to the fact that a majority of the factories are small, particularly in the western portion of this district, they did not commence operations until well on in May.

MILK TESTS. My duties did not begin until the 25th of May, and continued until the 25th of October. I visited 25 of the factories giving to each from one to five visits. I spent 48 days in factories with makers. At two of the factories I visited there was no

Babcock tester, and at some others the machine was so out of repair that it was impossible to make a proper test I tested 3238 samples with the Quevenne lactometer, and 219 with the Babcock milk tester. Lowest lactometer reading, 21.6 ; highest lactometer reading, 35; lowest per cent. butter fat, 2.5; highest per cent. butter fat, 4 3. Vat samples tested in May 3.2 to 3.4, in June 3.3 to 3 6, July 3.3 to 3.5, August 3.4 to 3.8, September 3 7 to 3.8, October 3.8 to 4.2 per cent. butter-fat. I found 34 samples of milk that had been tampered with. Twenty-one of the patrons from whose milk these were taken were dismissed with a warning, and 12 paid fines or damages, ranging from $5 to $20, amounting in all to $112. In the case of one brought before a magistrate he held that while it was satisfactorily proven that the milk sent to the factory was "deteriorated" it was without the knowledge of the patron and contrary to his wish and intention, and that he was not aware thereof, and the case was dismissed. While I do not wish to say anything disparagingly of the judiciary of this Province, I must say that I think some of the magistrates before whom such cases appear take a very lenient view of this serious offence, which does not seem to be decreasing as fast as would be desirable.

Making-rooms and Utensils. Speaking of the making-rooms of factories I visited I would distinguish them as follows : Seven first-class, seven second-class, ten third-class, and one entirely unfit in which to make cheese. The principal defects in a number of these making-rooms and utensils are, poorly constructed buildings, bad floors, leaking vats, filthy curd-sinks, racks, and sink cloths.

I believe the curd-sinks, sink cloths, and racks are accountable for a great many of the bad flavors we find in cheese. A number of making rooms are not sufficiently lighted.

Curing rooms. If there is any one thing more than another that is worthy of the factoryman's earnest consideration, it is the matter of curing-rooms. It does seem too bad that, after the patron has cared for and fed the cow, delivered the milk at the factory in good condition, and the cheesemaker has exercised all his skill in the process of making, the product should be placed on the shelves to spoil, which is certainly the case in a great number of our curing-rooms as they are at present. I have been in curing-rooms this summer when the thermometer indicated the temperature at 90 degrees Fahrenheit. In fifteen of the factories I visited there was no provision made for controlling the temperature in the curing-room. Two had basements under the curing-room, four had ice boxes, and four sub-earth ducts A curing-room should be properly insulated, with good ventilation from ceiling, well lighted with double windows and outside glass frosted.

Sub-earth Ducts. Two of the factories in my district put in sub-earth ducts this season, and two others were put in last season, and which have no doubt helped greatly in controlling the temperature in these curing-rooms; but I think the results have not been quite up to what was expected, as the success of sub-earth ducts, or ice boxes, depends largely on the construction of the buildings or rooms in which they are placed.

Whey. All the factories visited returned whey in the cans.

Whey Tanks. Sixteen of the factories have elevated whey tanks, and the majority of them are kept fairly clean, some of them particularly so, being washed out with boiling water once a week, and some even twice. Nine factories had whey tanks sunk into the ground. In the case of some of these there was no record kept of the date on which they had last been washed. If whey has to be taken back in the milk cans, I would strongly advise the management of cheese factories to elevate their whey tanks, and scald them out often to keep them clean, as there is no doubt that a filthy whey tank is the source of a great many bad flavors cheesemakers have to contend with, besides being a very bad example to the patrons.

Conclusion. In conclusion let me say that we have recently had a striking example of what Canadians can do by way of upholding the honor of their country. Then let each and all of us at the beginning of the year, at the dawn of this twentieth century, resolve that in whatever capacity we may be engaged in connection with this great dairy industry, whether it be feeding the cow, caring for milk, delivering it at the factory in proper condition, working at the vat, and curd sink, or boxing the cheese, that we will do our duty. By so doing we will do honor to ourselves and country.

REPORT OF INSTRUCTOR GEORGE McDONALD.

I have the honor of handing you my second report as Instructor and Inspector for this Association.

The district alloted to me comprises the counties of Huron, Bruce, Grey, Simcoe, Dufferin, and the parts of Lambton and Middlesex, north of the Grand Trunk railway between London and Sarnia.

The number of factories visited officially was 12, from one to four visits each.

I commenced work on the 2nd day of June, and finished on the 24th day of October.

I made 1,209 tests with the Quevenne lactometer, and 150 with the Babcock Tester. The highest test was 5 2 and the lowest 1.60.

I had four cases of tampering with milk. In each case I had a meeting of the directors, and left it with them to decide what was to be done with the offenders. In every case the directors decided to let them off with a warning.

I am pleased to report that some of the factorymen are making improvements to their factories, such as thickening the walls, putting in ice boxes, and putting in cement floors and better drainage to their factories.

As the work of an Instructor is much the same from year to year, it is scarcely necessary to repeat what has already been given in previous reports, as not being called to any factory where they had any serious trouble, I have nothing new to report.

In conclusion, I found makers doing very good work, with the exception of a few, who fail to make the most of what is at their disposal, and who do not understand that cleanliness is essential in making fine cheese.

REPORT OF INSTRUCTOR ARCH. SMITH.

I take pleasure in presenting to you my second annual report as Instructor for Cheese factories and Creameries.

The counties of Perth and Wellington were alloted to me for cheese factories, and the whole of Western Ontario for Creameries.

Having been given charge of the Illustration and Experimental station at Milverton, I was able to visit the factories only every alternate week. I spent 31 days giving instructions at cheese factories and 35 days at creameries, 6 days attending to prosecutions, and 5 days judging dairy produce at exhibitions.

I tested 3,215 samples of milk with the lactometer and 210 with the Babcock tester. The poorest sample of milk tested 2 2 of fat. The best sample tested 5.0.

There were six persons fined from $5 to $10 with costs, for furnishing deteriorated milk to be manufactured.

Care of Milk There is still room for great improvement in the quality of the milk and the farmers are not giving the matter sufficient attention.

Instead of the quality of the milk improving as it ought each year, it is found more difficult to manufacture a fine quality of cheese. So much has been said and written regarding the care of milk without obtaining the desired result that it would seem necessary to adopt some other means of compelling the farmer to give this subject more attention. The most effective means, I think, is for cheese and butter makers to refuse to accept milk which an adjoining factory has rejected. Thus the makers would compel the farmers to take better care of their milk.

One of the chief sources of trouble is the sour whey being returned in the cans as it soon spoils the cans, and it is almost impossible to properly clean them. At one factory which I visited the whey was pasteurized, and the tanks washed out every day. I was informed by the maker than when the whey was allowed to be returned sour, and the whey tanks left uncleaned for a single day the flavor of the milk changed distinctly for the worse. It only requires a few minutes each day to wash the tanks, so, if the whey is returned it certainly ought to be pasteurized as it not only assists in keeping the cans cleaner and improving the flavor of the milk, but also adds to the feeding value of the whey.

At three factories which I visited they were having serious trouble with tainted milk caused by worn out and rusty cans. By examining each can carefully, and by the use of the curd test, it was very easy to detect the patrons who were causing the trouble. On

their being requested to purchase new cans and to keep them cleaner they cheerfully did so, and the quality of the milk immediately improved. One maker furnished his patrons with cheese cloth to cover their cans at night, and claimed that there was a marked improvement in the flavor of the milk as a result. The cloth allowed the fresh air to reach the milk, and prevented foul germs from contaminating it.

Buildings. There is much need of improvements in the condition of some cheese factories, especially in the fittings and sanitation. Very few of them are provided with suitable means for controlling the temperature of the curing-room, and the cheese suffer in consequence. The drainage is also very defective in some factories. Some allow all the washings of the factory to run into the whey tanks, which is very objectionable. Others allow it to run away in open ditches, but this often causes serious trouble. A properly constructed filter bed, or the sub-surface system of drainage as recommended by the Provincial Board of Health, are very effective means of disposing of the sewage in a satisfactory manner.

Cheese. There was not so much improvement in the quality of the cheese as there was last year. This was owing possibly to the very dry, hot weather which affected the milk, and also the cheese in the curing-rooms. It also might be owing to the fact that several makers in endeavoring to manufacture a rich, meaty cheese, left too much moisture in the curd, which injured the flavor and the texture.

There were only two factories in my district where they adopted means for preventing the growth of mould on the cheese. One method was by use of formalin, and the other by a system of ventilation. Both methods apparently gave good satisfaction. Only one factory paid for milk according to quality.

Creameries. Most of the butter manufactured in western Ontario during the summer months is made on the cream gathering system. Much improvement can still be made, not only in the cream and butter, but also in the condition of the building, and in many cases in the buttermaker himself. At a number of creameries there was a lack of suitable cold storage, sufficient ventilation and good drainage. Judging from my own experience and the information received from buyers, I do not hesitate in saying that the quality of our butter is improving, but not to the extent that it should, the chief reasons for which are, the difficulty in reaching the farmers and teaching them the best methods of caring for their milk and cream, the cream being carried long distances and sometimes becoming sour and heated before reaching the creamery, the cream being gathered only two or three times a week, and the inability of the instructor to reach the makers most in need of instruction, owing to their not making application for his services.

In order to improve the quality of butter made on the cream gathering system, the existing conditions must be remedied. First, by using hand separators which will increase the quantity and improve the quality of the cream by collecting the cream oftener and having it delivered to the maker perfectly sweet so that he can develop the required amount of acid and the desired flavor, and by educating the farmers how to properly care for their cream, and the butter makers in the best methods of handling it after it is delivered at the factories, and by giving more attention to this method of making butter in the dairy schools.

Some of the creameries I visited were making nearly 3,000 pounds of butter daily, and when the cream is not delivered in the proper condition, and the maker is not thoroughly competent, the result is an unnecessary loss of money, and a decided injury to the reputation of Canadian butter. More attention must be given to the ripening of the cream and the use of the acid test, which will assist in making butter of a more uniform flavor.

A number of creameries require better storage, where the butter can be kept at a low temperature, as in many cases the butter is greatly injured before it is sold.

I would urge upon the directors of this Association the advisability of adopting a system of inspection that would enable their inspector to visit all the creameries and advise them regarding the best methods of handling cream and making more uniform and better quality of butter, and of keeping their factories in proper condition.

I also think that one of the most effective means of improving the quality of the milk and cream delivered at the factories would be for this Association to engage their instructors to attend their annual meetings, when nearly all the patrons are present, and endeavor to impress upon them as fully as possible the result of uncleanliness and care-

lessness in handling their milk, and the responsibility that rests upon them in promoting the reputation of Canadian cheese and butter.

In closing I wish to thank the directors of the Association, and the cheese and butter makers who employed me, for the kindness shown me during the summer.

Mr. McFarland : You speak about the farmers taking better care of the milk. Will you tell us your opinion as to how to take better care of the milk.

Mr. Smith : There is a paper specially on that subject to be delivered by a speaker at a future meeting. I would not care to encroach on him in any way by offering suggestions of this kind, as there will be lots of room for discussion after that paper has been considered. (Applause.)

Mr. J. N. Paget : I am sorry, indeed, that there are not more here to take part in the discussion. We consider the work of the instructors as among the most important part of the work that we are engaged in. When we appointed these instructors and sent them out on the road, our chief object was that they might come in contact, not only with the cheese makers in the factories, but also with the producers of the milk from which the butter and cheese is manufactured ; and I think, as has been suggested by some of these reports that have been read, that is the great question that is before cheese and butter-makers as well as before milk producers of this country to-day, to reach the men who are furnishing and supplying the milk to our cheese factories. If we do not get a first-class quality of milk supplied to the factories, it is impossible to get a first class article of cheese and butter manufactured, and for that reason, I say, I believe the most important work that the Dairy Association of Western Ontario, also the Dairy Association of Eastern Ontario, has to deal with to-day, is to try and reach the men and women who are interested in sending the milk to the factories to be manufactured into butter and cheese, so that milk may reach the factories in the very best possible condition. While the instructors have touched upon that question, they have placed a considerable part of the responsibility for deficiency in quality upon the shoulders of the cheesemakers. You have heard from the reports of these men that they attributed some of the difficulties to uncleanliness in cheese factories, dirty whey tanks, and so on. Now I think every cheesemaker who is in the business to-day ought to have enough interest in his factory and in his own reputation to keep his premises clean and his appliances clean, or if he has not enough interest in the business to do that, he ought not to be manufacturing either cheese or butter. It is a disgrace to a man who is a cheese or butter maker not to have sufficient interest in his calling or profession to keep his factory sweet and clean, and to make the best article he can. If he keeps his factory clean and sweet it gives him a great deal more force and weight when he goes out to talk to his patrons on the subject of cleanliness. The cheesemakers are supposed to come to these conventions. Seven-tenths of the farmers of this county do not attend our conventions. I believe if the farmers could only get out to some meetings of this kind, it would be the best way to talk to them. I am sorry that there are not more cheesemakers here to-day. I am firmly of the opinion that the man who will not try to do his very best ought to get out of the business and go at something else. There is another thing I noticed, particularly in Mr. Morrison's report, and that was the number of factories that made application for his services. The same remarks apply to Mr. Brodie's report Out of 120 factories in Mr. Morrison's district he received application from only 41, and in Mr. Brodie's district there were 100 factories, and he received application from only 25. Now I do not think this is as it ought to be. There is something wrong. You heard from the financial statement that we have expended during the year a large amount of money, and naturally we would expect to get something in return for that money. This is one of the means we have employed in order to reach the factories and reach the people. Why is it that more of our factories do not apply ? I believe this is the place to ventilate this thing. If there are men here to-day, who have a reason why they do not employ these instructors, let them give us the reason now. If there is something wrong about sending out these instructors let us know, and I am sure the directors will try to do better. We are doing what we believe to be best. Mr. McDonald said he had applications from only twelve factories, and there are 95 factories in his district. Why is this ? I would like to have that answered by these cheese and butter men here to-day. There must be something wrong. Either you are not in sympathy with our method of doing business, or there is something the matter; let us hear what it is. We want to expend the money of the

Association so as to reach the people that are sending the milk to the factories. I do not know that I have any right to occupy your time in connection with this, but there was one thing mentioned by every instructor, and that is with reference to the curing-rooms. I am very much interested in that question. I have given more attention to that, perhaps, than any other part of the cheese business, as I believe it is important to get the cheese cured right after it is made. There will be papers at a later stage of the meeting referring to this matter. The meeting is now open to discuss these papers, and any person in the audience may ask questions and the instructors will answer them.

Mr. GEORGE H. BARR : I do not know that I can say very much more, in regard to the reports that we have received this afternoon, than Mr. Paget has already said. I think we have had four very good reports. One thing about them is that they are very much the same each year. It seems we have been going along the last three or four years on pretty much the same lines. From accounts we hear of our cheese on the other side, we have not been able to make much progress. Now the cheese instructors are covering a good deal of our districts, and I think this is the place to question and to try to find out the reason that our cheese is not improving. We hear of dry chipped cheese, and we hear of open cheese, and cheese off flavor, and all these things. I am not prepared to say that we have the best method of instruction. I believe we have good men. We try to get the best men we can get hold of, and I think these men do as good work as they know how to do. There is one thing about our instruction that I do not think is just right, and that is, that our instructors do not make the cheese individually on exactly the same lines. We have one man who has a certain system, and another man has another system, and one gives instruction to do a certain thing in one division and another in the other. The makers from these several divisions meet and they compare notes, and they say such a man advised me to do such a thing, and the other says "Don't do that ; do something else." Now, I don't think that is right ; I think it would be an improvement to have our instructors meet some place in the spring to decide on every question of the handling of milk and curd, so that they would all give the same instruction. Of course, you have to use your judgment in different sections, but their points should be the very same, and each instructor should have the same points, so that one instructor will not conflict with the other. We have been putting all our money and occupying all our time in an effort to educate the makers. I believe our makers are away in advance of the patrons with regard to their duties, and I would suggest that we turn part of our time, and part of our money, to giving instruction to the patrons. We have three dairy schools in the Province, which our makers can go through and get all the knowledge that is necessary with regard to the cleanliness and tidiness, and the young men that are attending these schools will probably in later years show the effects of that training. Our makers should be able to tell their patrons at the annual meetings, in a forcible way, as to how to care for the milk; and they should set an example by keeping a tidy and clean factory. They should keep the things about the factory in a clean condition, and then they would have some influence with the patrons. I think our makers should go round and give instruction, but if they go round with dirty clothes, and have a dirty factory, I do not think the patrons will pay much attention to what they say about cleanliness. We are making an article of food, and I will guarantee that if anyone of our cheesemakers would go to a house to board, and if he saw the woman of that house go around as dirty and careless as some of our cheesemakers go, they would not want to eat anything in the house, and I think they would be right. Then, why should our patrons see our cheese makers go around in a dirty condition, and want to eat the food made in the factory. We hear this question of cleanliness preached day after day and year after year, and I do not know whether it does any good or not. I think it is one of the main points with regard to our cheese to-day, that our makers do not realize the necessity for being as clean and tidy as possible. It cannot be expected that the makers will go around with stand-up collars and broadcloth suits, but there is one thing they can do, they can wear clothes that can be washed every week and keep their aprons clean. If they will do that they will always have a clean, tidy appearance, and will set a good example to the patrons. Some of our cheesemakers call the patrons "hay-seeds," and think they do not know anything, but the majority of our patrons know just as well when a maker is doing right and when he looks right, as any other person. I am not prepared

to suggest any way out of these difficulties to-day, and I just merely throw this suggestion out, that we should devote more of our time to the patrons, and not so much to the maker. I am very much surprised to know from our instructors' report that they were not in greater demand. We reduce the fee so that every maker can pay it, and I think it is for the makers to tell us what they want, and what the trouble is. If these instructors are not doing what is right let us hear from you. It is only by giving us this information, that we will know what you want. I would like to hear from every maker here who has not employed instructors, to know why he has not done so. (Applause)

Hon. T. BALLANTYNE: As far as I know, and I am quite positive, I never heard of the employment of instructors until I suggested it, and asked a gentleman to move it. It has not been altogether a success, but we were the first to commence it, and it was the first thing in the way of general improvement. It was suggested to me in this way: I was travelling among the factories all the time, and if I found a factory doing badly, I invariably found that if I could get the maker to visit another factory that was doing particularly well, it improved him. That suggested to me the idea of employing instructors. The difficulty was to get a man in whom the maker had confidence, and to whom they would listen, and we coupled in the motion the name of an individual. Possibly it was not in all respects successful, but it was the beginning of it. For a long time our cheese in Western Ontario were at a premium over any other cheese on the continent of America, probably from a cent to a cent and a half per pound. I regret to say that the good reputation you then had with the dealers in England is not indicated at the present time by the prices we receive. It has been my privilege to be in England at all seasons of the year. I had an opportunity this year of being there, and I am sorry to say there is a large per cent of our goods developing flavors. The complaint has been they are worse this year than in previous years. That, possibly, is the result of extreme temperature. There were others that were exceptionally fine. The bad flavors may be caused by uncleanliness in the milking or uncleanliness on the part of the maker. A great many of our old factories are breeding grounds for bacteria. Whey coming back in the cans is all wrong. Why should we pretend to make cheese; why don't we say we are feeding hogs at once? It is utterly impossible for patrons to be particular when the whey is taken back. I make that statement because they cannot imagine that cleanliness about the cans is necessary, when sour, dirty whey is taken back every other day. If two individuals were supplying the city of London with milk, the one was taking back dirty whey in the cans and the other was scrupulously clean, do you think there is an individual in the city of London who would take milk supplied in cans that were taking back dirty whey? It is just as important that milk to make cheese should be clean. It is impossible to make fine cheese unless you get fine milk. The complaint in the Eastern Dairymen's Association was the same. The reason has been we have had more heat, and the milk has been in worse condition. In London I saw cheese of bad character arriving. They do not know what to do with it. A loss of four shillings a hundred weight was not to be considered. They could not sell them. At the same time there were perfect goods arriving. Nothing stops consumption like poor goods; people will not eat poor cheese. I have a letter in my hand from a customer, complaining about the quality of the cheese. He says in part:—"It is the quality of your western cheese this season that has make us reluctant to give orders. It is not a question of two shillings. But at the same time we have never seen finer cheese than this season's (names a factory)." That was a factory where they had not returned the whey. I may say it was Black Creek. That is a factory that I have owned for 33 years, and I have said, and I will repeat it, that I would not take the responsibility of running a factory 24 hours where the whey is sent back. I would put a match to it and burn it rather than I would run it. (Applause.) The dairy business depends upon the quality. Our American friends lost their market. They cannot regain it. We are losing ours, and losing it rapidly. I was in London this season, and examined some stuff that had been sent. It was not fit for consumption. We shipped a lot to a customer, a sale of 1,000 boxes. I found they were in perfect condition, but they were made in factories where the whey was not returned in the cans. On a lot from another factory, where the whey was returned, they lost fifteen shillings per cwt. on the cheese. We have not had the heat to develop that bacteria in other years. That is the reason we have not previously had this loss. I am humiliated to hear your instructors talk as if there was no cure for that sour whey. There is only one way to get rid of

it, and that is to quit sending it back altogether. Another thing referred to was having the clothes clean. There is no question about it ; they should be kept scrupulously clean. Another matter I wish to refer to is that of the curing-rooms. We had a shipment of 600 boxes from four factories In two of them they had been using ice to keep down the temperature, and they succeeded in keeping it down below 70. In that extreme weather that we had the last half of July they could hold their temperature so that it never got above 70. The cheese from these two factories arrived all right, but those from the other two factories caused a loss of fifteen shillings a hundred weight. There is nothing to prevent every factory getting a good supply of ice. Cheese is not finished when put on the shelves ; it should be kept at a low temperature in the curing-room. I ventured the opinion at Ingersoll, that it was more than the life of a cheese to put them in first and second storeys in curing-rooms, and the late James Harris said,—"I have as good a curing-room as there is in the country, three stories high." But I say it is not right to have them in these upper storeys. You can get farmers to haul ice for you, and they will not charge you anything for it. Another matter that Mr. Barr referred to was that the instructors should all pursue the same system. When we had instructors before it was felt that it was important that they should get together once a month. Mr. Bell, of Tavistock, had the reputation of being a good maker ; so they met there. His factory was a sort of school. I certainly would advise the Association to adopt a similar plan. In my early days our best young men and the most intelligent sons of our best farmers were anxious to learn cheese making. There was something to tempt them to go into the business. They hoped they could earn more than they could on the farm. But now they are being screwed down, and you are driving your best men out of the business. The result is that it is entirely different to what it was. I do not know anything that requires more intelligence and closer observation than cheese-making. Milk is a perishable article ; it is so easily injured, changes are going on all the time Something they have not had to cope with one day they have to tackle another. Above all, we must have the milk delivered in good condition, must have the factory surroundings clean. At Milverton they had an object lesson. It was all very fine when we were getting a cent and a half more a pound for the cheese ; they then thought they could do anything. That day is past, and it is going to be more difficult for the factories that are doing well to get the price that they are entitled to, because there is a prejudice against everything western, instead of a premium, as there used to be, and a very large premium, indeed. We are scarcely holding our own. Excuse me for emphasizing these things, but these are matters we want to get at. (Applause.)

Mr. A. T. Bell : I noticed in Mr. Smith's paper he mentioned a factory where they have the system of ventilation by which mould is kept off the cheese.

Mr. Smith : I did not visit that factory regularly. I simply called in once or twice with Mr. Goodhand. The ventilators were quite large, possibly 15 inches in diameter. There were two, both in one curing-room. They extended about five or six feet above the roof. They were arranged so that they could be easily closed below, or left open at will, and that was all there was to it. The maker informed me that he had no difficulty during the whole season with mould on his cheese, and at the time I visited the factory last there was two months' cheese in the factory, and no sign of mould on any of them. I believe the secret of success was that the air in the curing-room was kept pure and fresh, and that the hot air was allowed to pass off. The mould could not grow in the pure atmosphere. The ventilators were made of galvanized pipes. It was not a large factory, possibly the room would not be more than 20 by 30. It was a frame building.

A Member : Was there a circulation of air under that ?

Mr. Smith : No. I think it could be much improved by allowing the ventilators to come up through the floor, but in this factory there were none ; it just came from the ceiling.

A Member : Where was the inlet for the air ?

Mr. Smith : There was no inlet provided ; I suppose simply through the windows and doors being open occasionally. That was the only means that I know.

A Member : Just a wooden floor ?

Mr. Smith : Yes.

A Member : Was that factory noted for mouldy cheese before the ventilators were put in ?

Mr. SMITH: I was told so by a maker.

Mr. PAGET: These ventilators were left open all the time?

Mr. SMITH: They could be closed at will, but I understand they were left open nearly all the time. I think if the curing-rooms were properly insulated, so that they would not become hot during the day, and if they were provided with good ventilation, we would have a much better quality of cheese, because the cheese would not mould and the temperature would not go up, and there would not be the necessity for the expensive apparatus that is at present used in some of them.

Hon. T. BALLANTYNE: How would not the temperature go up in the first week of August this year? Is there any insulation that would have kept the temperature down?

Mr. SMITH: At one factory I worked in, during a whole season the temperature never went above 70, and there was no means whatever provided for controlling the temperature there. The room was insulated and protected from the heat. The cheese would mould, but I think if that room had been provided with good ventilators it would have been almost a model curing-room.

Mr. MACLAREN: What season was that?

Mr. SMITH: 1894. It is in the Brantford factory. It has a stone basement.

Hon T. BALLANTYNE: When you have extreme weather such as we had this year, how are you to control the temperature unless you use a sub-earth duct or ice? I never saw any curing-room that you could otherwise control the temperature in very hot weather.

Mr. SMITH: That may be true, but at the same time we may say that we do not find any factories that are thoroughly insulated. Of course, this year was an exception on account of the nights being so hot, so that the room would not cool down during the night, but this year was an exception to the rule.

Mr. BELL: What do you think of formalin to prevent mould?

Mr. SMITH: I think that is a very good plan. At the Milverton factory the cheese moulded very quickly. The ceiling is low and is closed up for some time in hot weather, so the cheese moulded quickly and badly. Each cheese moulded as black as could be. After we started using the formalin we had no more mouldy cheese, during the remainder of the season. We used it daily, using a large quantity at first. We used a quantity in two weeks that was supposed to be sufficient for nearly two months. We thoroughly disinfected the room after which, by using a very small quantity daily, we had no more trouble.

A MEMBER: What is your method of using it?

Mr. SMITH: Simply putting it in with a spray. I think the sprays most of the makers have are too small. They do not deliver a sufficient amount. We spray it in between each cheese on the shelf. Just go along as fast as you can walk, and spray it in between each two cheese. It is pretty hard on the eyes. You cannot stay in very long.

Mr. MACLAREN: What per cent. of strength is it?

Mr. SMITH: That is more than I know.

Mr. GOODHAND: 40 to 1.

Mr. BELL: I noticed that what we had last year was harder on the eyes than that we had this year.

Mr. GOODHAND: We got some from both places to find out if there was any difference, and we decided that the principal thing was to put enough on at first to kill the mould, and that then it took very little to keep it down. I do not know any factory that was more noted for mould than ours, but after we used it our cheese came out of the curing-room just as they went in, perfectly clean. They did not have to be rubbed. If it was twice the price I would not be without it. And another thing, in our curing room there was an objectionable smell. We had not proper ventilators. This did away with all that. There is a sweet smell in the room, and I advise everyone to use it for the purpose of keeping off the mould.

Mr. THOMAS J. BOLGER: Mr. Ballantyne emphasizes the fact that the whey should not be returned in the cans. I would like to know just what way he finds the best for compensating the patrons. In West Williams I find they think a great deal of the little whey that is returned to them.

Hon. T. BALLANTYNE: It just depends on circumstances. Where it is a co-operative factory they can sell the whey to some individual, and he can use it much more economic-

ally than it can be hauled back to each individual farmer, and the cans will last twice as long. The sour whey takes the tinning off the can. They appear perfectly strong and able to do their work, so the patrons continue to use them when they should not be used. Where the factory is owned by an individual he would have to make some allowance, but where it is the property of the patrons they can sell it for so much a gallon, and it can be fed somewhere convenient to the factory. I think it can be fed there much more economically than by taking it back in each patron's can, with all the labor that implies and the injury to the cans. My opinion is, that if you are going to continue making cheese at all you will have to quit returning the whey. I remember what Mr. Farrington, the father of dairying in this country, said thirty-four years ago: "If you commence right you can keep right; but if you commence wrong it is hard to get right." Now that is exactly my experience. No person ever asks in my factory to get back the whey. They would not take it back. It is true there was a factory not one hundred miles from there started up and gave them back the whey. They may get one or two of my patrons, and it so with all other factories, but as a rule where the whey is not taken back the people do not want it, and if they do want it they should not get it. If you are going to make fine goods you must not return the whey. We have reports from England as to our cheese, and where the whey was not taken back they say they never got finer goods. When I was about the country more than I am to-day, frequently in the evening I have come to cans and found them full of sour whey. It is impossible to make these farmers believe that cleanliness is necessary with the milk pail, or anything else, if the milk is sent to the factories in these cans. I know of no better way to illustrate it than to ask you "Is there a person in London who would buy an ounce of milk that was brought to them in the same cans that are used to carry whey to the factory?" Now it is just as necessary to have milk as clean as you would wish it to be to feed to your baby, or for the porridge, for the purpose of making cheese. I was at Frome in England, the centre of the Cheddar cheese industry, and saw a cheese that was a year old that was as sweet as a hazel-nut, and had that melting character. If we could make cheese of that quality there would be no limit to the demand. We would never see eight cent cheese again. Poor cheese diminishes the consumption. If four men go to a grocer and they each get a piece of cheese, if it is a poor cheese they don't eat it. It lasts three times as long, but they don't want any more. But you get a piece of fine cheese, and what is the result? Why, it is eaten in a day and you are back for more. I was impressing upon a grocer in this country the importance of keeping fine cheese all the year round, and last year he started with two hundred cheese, and his customers found out that every day they went to his store they could get a piece of fine cheese. He did not believe he could use half of two hundred, but he had not a piece of cheese left before the season was out. You can hardly limit the demand for cheese if you supply good cheese, but nobody wants rank, strong stuff. To get fine cheese you must get the milk right, and the surroundings must be right and the cheese-maker must know his business. The public are getting more fastidious with regard to food every day. We stored, for a customer in England, a large quantity of cheese at the high price of eleven and one quarter. They sent for samples and we sent them samples. They asked us, after inspecting the samples, to send certain cheese, and every one of them was from factories where they did not send back the whey.

Mr. McFARLAND: How does the whey become sour in your locality?

Hon. T. BALLANTYNE: I am not speaking of any other locality. I would not run a factory if the whey was sent back in the cans

Prof. H. H. DEAN: I believe it is well for us to see our faults, but the reason we have had so much fault finding with our cheese this season is simply the high prices. They nearly always tend to reduce the quality and make everybody careless, and I believe that in many cases that is the foundation of the whole trouble. We have been too prosperous during the past two seasons, and to my mind we are on the verge of lower prices. I think the quality will improve. There are three or four things necessary in our cheese business which require immediate attention, that have not been touched upon. First the patron must deliver to the factory, good, clean, cool milk. I believe the foundation of the successful caring for milk is cooling. I believe we have to go back to the old idea and cool the milk. The germs that give us the bad flavors that the cheese maker has to fight against work at high temperatures, and, therefore, we must work at a temperature that is not favorable for these germs; and when the patron leaves his milk in the cans at a

high temperature, he leaves it there favorable for the development of the bad flavors, so the sooner the milk is cooled off after it comes from the cow, the better.

A great many of our cheese factories are wholly unfit in which to manufacture cheese, but I believe the time will come when wooden floors, walls, and gutters will be a thing of the past. In these wooden floors and gutters the organisms are breeding that give us bad flavors, and I believe the time is coming when these things will be ripped out of the factories. If the patrons cool their milk there is one thing the cheesemaker must understand, namely—the proper handling of cultures or starters. The time is coming in connection with our cheese business when every cheese maker who does not understand the theory of cultures will be behind in his business, and will soon have to get out of the business. To my mind the bacteriologists help us in our business more than any other science I know of.

There are three things I consider very essential in order to improve the quality of our cheese.

1. The patron should supply the cheese factory with clean, cool milk.
2. The cheese factory shall be clean with no rotten wooden floors, or wooden gutters.
3. The cheese maker should understand how to use and prepare cultures and starters and use them with judgment. I believe these things will help very materially in the manufacture of cheese.

One other point. Our cheese must be cured at a lower temperature because, when we get above 65 degrees, you have a temperature favorable for the germs which produce bad flavors. Cheese cured at 70 degrees makes it favorable for development of bad flavors. If we keep them at a temperature of 60 degrees these bad flavors do not develop.

The CHAIRMAN: I take great pleasure in introducing to you Mr. C. P. Goodrich, President of the Wisconsin Dairymen's Association.

ADDRESS

BY MR. C. P. GOODRICH, FORT ATKINSON, WISCONSIN, U. S.

This is my first visit to Canada. I have been a dairyman in the state of Wisconsin for a great many years. We have been looking with admiring eyes towards Canada, notwithstanding some of the speakers here to day seem to put yourselves down as not as good as you might be. When a person or a body of men feel that way they are on the road to improvement. We have been looking with admiring eyes towards Canada, for the reason that you are ahead of us. I have got to admit it, in the price that you get for your dairy products, and the reason of it is not far to look for. You have rejected fraudulent dairy products. Filled cheese you sat down on long ago, and I do not know that it was ever made in Canada.

Hon. Mr. BALLANTYNE: Never a pound was made in Canada.

Mr. GOODRICH: There were some made in the United States, which hurt our market and our character, and we have not outgrown it yet. We have prohibited the making of filled cheese, but still the men in the English market are suspicious of us because we had once done wrong. It takes a lifetime almost, to build up a good reputation, but you can blast it in a very short time. We understand you absolutely prohibited the manufacture of fraudulent butter. We have not done it. We are trying hard to do it, and are going to do it, but it will take us along time to recover from the bad effects of what we have done. I have discovered another reason since I have been here why you have succeeded so well with your dairy produce. I notice that every speaker emphasizes the fact that you must have pure milk. That is the way to talk, and I wish I could get some of you Canadians to go over and talk to our folks. Of course, it is talked some over there, but they don't bear down as hard on it as you do here. We have been trying to get Prof. Robertson to come and talk to us in February, but he says he cannot come. I am glad I have come here. Perhaps it will arouse a little more enthusiasm in me in that direction. Now, I am not going to praise you all the time, (Laughter.) I have discovered from the report of the instructors, that the Babcock tester is not used in all the factories

as the basis for dividing the proceeds. I think that is a very important matter, as I think the men should be paid in just the proportion he pays into the pool. No one can say that a man who delivers 3 per cent milk, should have as much for it as the man who delivers 5 per cent milk to the creamery There has been a little question about making cheese, but it has been demonstrated that milk makes cheese somewhat in proportion to the amount of butter fat it contains. 5 per cent milk makes more cheese that 3 per cent milk, and makes it of a better quality. We should do everything we can to help men to be honest. We have a practice that is such a temptation to them to be dishonest that some cannot resist it. I tell you it's dangerous business. It is not only endangering the business they are engaged in, but it is endangering their souls for all eternity. There would be no necessity for watching for skimmed and watered milk, if they were paid for the butter fat. Nobody would want to do it. (Mr. Goodrich here told a very interesting story illustrating how a farmer started to take the cream off the top of his milk for one night, and then gradually got worse and worse until he made a practice of skimming milk. This practice spread throughout the neighborhood until several farmers in the same district were doing the same thing, and till every body in the neighborhood became suspicious of one another ; but, after the Babcock test was used, the practice was stopped.)

Now, I have felt a great interest in the introduction of the Babcock test. I have travelled a great many miles without any more recompense than the thought that I was helping to introduce a thing that would keep men honest, and that would help the dairy business. There is another temptation : it tempts men to breed cows that give a large quantity of milk no matter what the quality is. I did not know there were any cows here that gave milk that is only 1 6-10 per cent, but do you believe it ? I do not believe there are any such cows. One thing mentioned by one of the instructors was that the patrons had separators, and separated their milk at home, and delivered only the cream. Now, I think we are coming to that some of these days. A man can take care of the cream a great deal easier than he can of the whole milk, and this hauling all the milk to the creamery and then hauling back 7-8 of it is not profitable, and the 7-8 is not in near as good condition for feeding to the calf as it was when fresh I used a separator on my farm for a great many years. It has saved me a great deal of work, and has given me a great deal better calves and cows. The calves have the skimmed milk warm and new and sweet within 10 or 15 minutes after it was milked from the cow. Where a man has only 2 or 3 cows he thinks he cannot afford a separator. I know several creameries in the United States, and some of the most successful ones, that are carried on in that way.

MANAGEMENT OF CHEESE FACTORIES.

By G. E. Goodhand, Milverton.

I just wish to talk to you a few minutes on "The management of cheese factories." I think it is important that the young man should know more than just how to make cheese ; he should not only know how to make cheese, but how to manage the patrons of the factory. He should be capable of getting up on the platform at the annual meeting and having a good talk to the patrons. That is a very cheap way of getting at the patrons, because you have them all there before you and you can talk to them there. It is not necessary for him to be an orator or able to make a speech. He can talk over the best methods of managing the business. The farmer thinks the business belongs to the man who owns the factory, but I deny that. It does not belong to the man who owns the factory. It belongs to the farmer, because there would be no business if he did not send his milk to the factory. For that reason, I think we should try very hard to impress on their minds that this business belongs to them, and to try to interest them in the business. Let them have a chance to appoint their own secretary and salesman, even if they are going to appoint yourself to the position. If you own the factory, let them have the appointing. It gives them confidence in you, and makes them believe you are trying to do a fair business because you are willing that they should know all about it. One thing we have heard a great deal about to-day. and I suppose we will hear more about it before the Convention closes, and that is cleanliness. That is one of the subjects you should talk to the farmer about cleanliness in his milking, and cleanliness in taking care of the milk.

Now I think there is a great deal of milk spoiled in a filthy stable through the milkers not being careful while milking, and there are many farmers who do not wash their cans clean. I know for a fact there are some where the whey is sent home in the cans that just carry down a pail of water to wash the can out. They only take one pail, and that pail is supposed to wash the can clean that has had whey setting in it from morning until noon, and then set from noon to night for the washings to dry on. Now, that is a mistake; no can can be washed clean in that way. The cheesemaker should be able to instruct the farmers with regard to these things, and advise them by all means to wash their cans properly. And the cheesemaker should be able to give them a good idea as to what they should do with regard to taking care of the milk. Professor Dean said this afternoon that he thought we would have to go back to cooling our milk more than we do at the present time. I think that is quite true—I always did think so. I never advanced the idea very much, because a good many people spoke differently; but I never thought much of stirring milk a great deal, for the simple reason that we have not a pure atmosphere, as a rule, to cool our milk. (Hear, hear). And we contaminate our milk more than we benefit it by stirring. If we had pure air, stirring would be a good thing. I advocate cooling it down, but if you do not do that there is one other way which I claim is a good way to keep milk, and that is to keep it in small quantities Have sufficient pails to hold your night's milk, and place them in as good atmosphere as you can get. Hang them up. Put a couple of posts in the ground, and a scantling on top of them; put hooks in the scantling, and hang each pail on a hook. Strain each pail before you do this, and then pour the milk from one pail to the other two or three times in the evening, and I am satisfied you will have much better milk than you will have by airing it alone and leaving a large quantity together. By instructing your patrons in these things they will work with you.

There is another important thing we forget in our hurry to get through the day's work. We should have time enough, or help enough, in the factory so that we can get away before our day's work is finished and visit patrons who have not sent very good milk in the morning and give them friendly advice. Tell them that you have not come to warn them that you will not take their milk or that you will send it home, but talk to them in a friendly way and try and help them. Try and find out the cause of the milk not being what it should be. I have known patrons to send in bad milk, and have visited their place and found in some cases that there has been something wrong with one of the cows in the herd. Now, the trouble with the farmers is that they are pretty anxious to make a dollar, and their idea is that if they can get the milk past the nose of the cheesemaker they have no interest in it. This is a mistake. You want to make them understand that they have an interest in that cheese until it is consumed. If there is any loss the reflection comes back on the factory and the farmers will lose by it. Although the cheese maker loses directly, the farmers lose more. If you can get them to understand that, in nine cases out of ten they will do better. But in order to be able to give the farmers this advice, it is absolutely necessary that the cheesemaker should be clean and tidy himself. The cheesemaker should clean his factory up on the outside and keep everything clean around it. Fix the drains and have everything proper; then, when you have everything right outside, commence on the inside, and one of the main places to commences is right in the weigh-stand. A great many cheese makers forget the fact that if the patron finds out, or thinks, his milk is not weighed right, he will not have much trust in the cheesemaker. But if he sees a good, clean scale, and is sure the scale is in proper condition, he will not say much about his weights; so I would advise the cheese makers, whatever else they do, to have their scales in good working order. The best man in the factory should always weigh in the milk, and each farmer should be given full weight, and should not keep off one or two pounds to help make up the average. I know that used to be done quite frequently, but I do not think it is practised much now. We give the farmer exactly every pound Of course, on a rainy morning we try to average it up, but we make it as near right as possiole.

There is another little thing which causes a great deal of annoyance to a number of patrons, and that is the pass-books. In a great many places a number of makers forget to send out their pass books as often as they should. They let them run over a week once in a while. That dissatisfies the patron. I have always made it a point in my factory, if any person sends sour or tainted milk, to have the cheese maker note it down in the

pass-book. That has quite a good influence on the patrons, because they see this, and they often get their book out and show it to their neighbors, but they feel ashamed to show them if they have three or four lots of tainted milk, so they try to have good milk on that account. As regards the inside of the factory, I know there is not a cheese buyer but who can say that there are a number of makers that use cloths for their cheese and for strainer cloths that are not fit to go near anything to be used for human food. Some of them are filthy. We should make our cheese makers keep their cloths clean, and also their curd sinks. In my opinion that is where the curd gets most of the bad germs,—through these filthy cloths that are used at the curd sink.

Then about the cleanliness of the maker himself. It is a mistake for the maker to go around the factory with a dirty apron or dirty clothes. As Mr. Barr said, he cannot go dressed up with a white stand up collar, but he can have washable clothes and keep himself clean. Some men keep their factories clean but they do not keep their curing rooms swept. I know for a fact that when a buyer goes to a factory to buy cheese, if he sees things dirty around the factory he looks for bad results, and there is an old saying, "that when a man looks for bad results he generally gets them," but if buyers see a man trying to keep everything right, and clean and tidy, they are going to do all they can for him I think they try to help a man who is willing to help himself, but if they see a man who is not trying to help himself they are apt to be hard on him.

I wish to say a few words regarding the Experimental Station. I think it has done a great deal of good to my patrons; in fact, I know it has. Nearly all my patrons have been in to see it, and have been pleased with it, and pleased with the way the factory is fixed up and the cleanliness of it. It was one of the oldest factories in the country, but it was fixed up so that it was quite presentable and looked very good for an old factory.

I think Mr MacLaren says, "the best thing to do with an old factory is to burn it down and build a new one." That is all right if you have the price. I think an old factory can be fixed so that it is quite fit to make cheese in. We had a lot of difficulty with mould in our curing room, and I did everything I could think of to keep the mould out, rubbing the cheese, and so on. Mr. Robert Ballantyne came in there and advised me to try formalin, and said, "I am sure that will keep the mould out of the room." I asked how much he thought I would have to use, and he replied, "one bottle in two months." Other people had told me it was no good, so I spoke to Mr. Smith about it, and he advised my cheesemaker to use this bottle in two weeks, instead of two months. I did so, and it disinfected the room thoroughly, so that from the time we commenced to use it we had no more mould. It didn't take the mould off the cheese that had already been moulded, but it kept all the rest from moulding, and from that out we had no mould. Our cheese after that went away just as clean as when they were put in the curing-room, and the appearance of the room is so much better. I think it could be possible for us to get that formalin cheaper. We used three bottles altogether, and we kept our room free of mould. I would not be without it, unless I could so fix my room that we would not have any mould.

I would like to speak a few words on the sewage system. Where this sewerage has been put in I think you could not find a worse place to drain anything. It was just a black-ash swamp where the factory stands, and under the top, the soil is very heavy clay, and it is very hard to drain that land sufficiently to grow anything on it. I feel satisfied, however, that this sewerage system can be made to work well in that soil, and if we can do it there it will be very easy in any other place. I will not keep you longer. We have plenty of speakers. I thank you for your kind attention.

Mr. DERBYSHIRE: What was the expense?

Mr. GOODHAND: It cost over $300, but you all know that, in an old factory, you have to expend $100 or $150 every year, if you intend to keep it in workable order. The factory was white-washed on the outside. The rougher the boards the easier they will take the white-wash. I am satisfied that the cheese was improved enough to pay for everything. We all know the buyer will not pay you more than he pays your neighbors, until after your cheese has been sent to the Old Country and you have established a name, and then you can get your price. It takes a few years to work that up. I feel it is going to help us in the future.

Mr. DERBYSHIRE: You saved in the shrinkage.

A Member: Do you return the whey in the cans?

Mr. GOODHAND: No; I am like Mr. Ballantyne The day I have to do that I will quit the business. My patrons came to me and said they had to have their whey home or they would send their milk to the neighboring factories. I was very thankful they told me beforehand, because I prepared myself for them, and had the history of most of the factories around and the prices they got. I gave them the facts, and then I said: "You can have your whey home if you want it under one condition, and that is, that you be responsible for all whey flavors, and we will leave it to the buyers." I asked the chairman to ask the patrons if there was any who wanted their whey back to stand on their feet. There was not one stood up, but then some of the patrons stood up and said if the whey comes home on the waggon I won't send my milk to the factory. I am satisfied that if I went home to-morrow and told them they could have the whey home, I would lose more patrons than I would by telling them they could not have it. My neighbor, Mr. Clarke, has about the same experience. While there are a few who clamor for the whey, the best patrons don't want it. The men who send you the most and the best milk are the men who do not want the whey back. We wash the cans at the factory and steam them out thoroughly. I can say that our prices may have been equalled, but very often we get higher prices than our neighbors. Mr. Clarke's price and my price run very close together all the time. We have paid more to our patrons than any other factory around for the last four or five years.

Mr. DERBYSHIRE: Then the buyer does justice by you.

Mr. GOODHAND: Yes; if you make an improvement you may not get it at once, but you will be sure to gain in time.

Mr. BALLANTYNE: His statement regarding patrons and the whey, corroborates very fully what I stated this afternoon. Those that have not been in the habit of getting it don't want it. He was too modest to tell you that he got for his September cheese 11¼ cents, and for his October cheese 11 cents, and I think that is the best evidence of quality. (Applause.)

THE DAIRY COW.

By C. P. GOODRICH, FORT ATKINSON, WISCONSIN, U.S.

The subject I am to talk on this afternoon is the dairy cow; that is a subject that I delight to talk on. I love the dairy cow, she has been my best friend, she has been my financial salvation, and why should I not try to proclaim the words of salvation to everyone? (Applause.) The dairy cow is the cow that will consume and digest, and turn into milk, a large amount of good milk producing food, save only just enough for herself to live upon. And it is a dairy cow that a dairyman wants. If he is a dairyman he wants a cow to do that kind of business and not another kind. Cows, before they had been handled and improved by man, gave just material enough to sustain the young, just like all other animals. The cow gave it just as long as it was necessary for the calf to have it, six or seven months; then she dried up, and she put on flesh, because it might be that she would have to go through a period of starvation. So you see the cow naturally had these qualities of giving milk and laying on flesh. Then man took hold of the cow. And one set of men went to improve her in the direction of giving milk, selected those that were the best milk producers, fed them in a way to produce best milk, and milked them for that purpose, and got them to give milk as long as possible. Another set of men went to improve their qualities for making beef. Now the question is, can you tell by the form of the animal what has been her business, or what has she been bred for? I will tell you how you can find out; I can tell you how I found out. My father was one of the first dairymen in Eastern Wisconsin. He commenced in 1847 when I, as a boy, helped to draw the product to market, when we had to take two days to get there. When I got to work for myself I thought I would improve my herd of dairy cows. I had a pretty good herd, but I wanted to make them better. In the first place I had to find out which were the best cows in the herd; and there was no way to find out except to weigh the milk for a whole year, and see what each produced in the year.

Now we have the Babcock tester, and we can test it and get at it very easily. In those days I had to set the milk of each cow separately. Of course, I did not arrive at

it very exactly, but I could approximate quite nearly; and in that way I selected my best cows and rejected the poorest; then I selected a sire from one of the best looking families I could get, then I got the heifer calves, and I rejected the poor ones. I did not pay any attention at all as to how the heifer looked; the one that could produce the best was the best one; and, by the way, she was the handsomest in my eyes, for, "Handsome is that handsome does," every time. I did not care whether the heifer or cow was in form of a camel or giraffe if she would only give me a lot of rich milk. That is all I asked. (Applause and laughter.) After I had gone on in that way for many years, every year gradually improving till I finally got a very good producing herd, I found they all had certain characteristics of form, every one of them. They were not all the same colour. Some were brown and some squirrel grey, some had their horns lapped down and some their horns curved in; these things did not cut any figure at all. The color of the hair does not amount to anything, nor the crook of the horns, but I tell you there is a great deal in the animal. In 1893 there was a dairy test, in Chicago at the World's Fair, when there was a prize offered for the breed of cows that would make the greatest net profit, 25 cows of each breed to be tested, and the test to last all summer. Now this meant a great deal to the owners of the different breeds of cattle. They spent nearly $100,000 hunting up the cattle. Mr. Fuller, the superintendent of the Jerseys, received from Texas and from Maine, and other states, letters from people stating that their cows would produce eight, nine, or ten hundred pounds of butter per year. Mr. Fuller, or somebody else as well posted as he, went there to see the cow. If they thought she was good enough they gave instructions so that the cow would be fresh at the right time, and to be sent on to Chicago, and if they thought the cow was not good enough they rejected her. There were twice as many cows sent on there as they wanted, and then they were tested over. The Jersey men had fifty cows that were treated twice. Some of them had records of nine hundred pounds, and Lilly Flag had a record of over 1,000 pounds; but some of them did not come up to the mark, and were not put into the test. It was the same with the Guernsey and the Short-Horn herds. Those were the three herds that were entered. If you know of any way that you can get 75 of the best cows in this continent, tell me how you can do it. I believe they had 25 of as good cows as they could get out of each breed. When I looked those cows over I found there was a similarity of form no matter what the breed was, and I called that the dairy form. I spent a good deal of time at Chicago that summer. One of my sons was the buttermaker who made the butter in that test, and the most delightful place I could be in was these cow stables; I had free access to them. Everybody could not go in, because some men do not know enough to behave when they get into a cow stable. They get into too high company when they get into a cow stable. I said to myself, "Here is a chance I will never have again in this world." It was my life's study studying the cow, and I made the most of it, and I want to tell you here to-day that I spent more time in those cow stables than I did in seeing that magnificent show. I used to think it was my duty to get out and see some of those wonderful sights, and I started several times to go to the north end of Jackson Park, but I never got there but once I could not get away from the cow stables. You can say "Old Goodrich is an old fool." But I don't care, I was studying the cow for all that was in me, and I used to take a camp stool, and look a cow over and over. And there was the champion cow of the whole lot, "Brown Bessie" She made more butter and gave more milk than any of the rest of them. Now, that is not because she is a Jersey. It is because she has got the dairy form in perfection. The picture I have displayed on the canvas (pointing to the picture) is not a very good representation of her. There is no artist in the world can represent her. I have got a better picture, and I want to tell you I have carried that picture right by my heart ever since. (Applause.) She has a great charm for me. I would sit down on my camp stool and look her over for half an hour, and then I would shut up my eyes and see if I could see her; doing just the same as I did in the Sunday School lesson—I would shut up the book and then see if I could remember it. Then I would look her over again, then shut up my eyes, and at last I got her so fixed on my brain that I have been able to see Brown Bessie ever since, whether I am asleep or awake.

When I come to look at a cow to judge her, so as to know whether she is a good dairy cow or not, I'll tell you what I look at first. I look right at her head. If she has not got a good head she cannot be the best kind of cow. She should have a large, full,

bright, mild, intelligent-looking eye, and a large forehead, showing that she has got a strong brain. That is where the nervous force starts from. It takes a strong brain to have a strong nervous force, and these forces are necessary to a large producer of milk. The spinal cord comes from a strong brain, and runs right through the spinal column; then the nerves are coming out from each section of the backbone, going down and doing the work.

After I look at her brain I look at her jaw. She should have a strong muscular jaw, showing that she is a good feeder. Those parts of the body that are most used are most developed. If she has been a good eater she will develop the jaw.

Then the next thing I look at is the depth through the body. I want to see that she has got a large capacity for handling the food, that she has got a large digestive capacity for working out the large amount of food; that her strong jaws are able to eat.

Then I see that she is well cut up under the throat, that she has a thin neck, and that she has a large heart room. Now you could always put your hand under Brown Bessie's shoulder, between that and the neck. Then I look along the back, and I see that she has got a strong back. A strong bony structure indicates that there is strength of body beneath

Now, a great many men, and I do not know but that they are the majority, when they go out to buy a dairy cow, want her to be fresh, so as to see what she can do. The main thing they look at is the udder. If she has a great big fine udder, and if the owner says she gives three or four pails of milk a day, he can get a big price. I want to say here to you that the great, big, fine udder has fooled more men than anything else. A cow must have a good udder, but that is not the only thing. I heard Professor Hacker, of the Minnesota Agricultural College, talking on the cow. When he got through he had not said a word about the udder, and somebody said "What about the udder?" and he replied "You need not worry about that; if she has the right form all the way through, nature will supply the udder." Nature fails sometimes in one spot, and sometimes in another. If it should happen to fail there she cannot be a very good cow. The cow with the big udder is something like the man with the big pocket-book. I have a big pocket-book, but the trouble is my head is not good enough to keep it filled one day after the other, and it is just so with the cow with the big udder. If she has not got the machinery to fill it, she is a failure.

At the World's Fair there were the Jerseys and the Guernseys and the Short-Horns. In 1797 there was a man, of the name of Clay, imported some dairy Short-Horns from England. They have been kept pure ever since, and are called the "Clay Family of Short-Horns." There are not many of them, but they are splendid dairy cows, and in the 25 Short-Horns in the dairy exhibit at the World's Fair nine of them were the Clay family. There were Kitty Clay III, Kitty Clay V, and I don't know whether they were all Kittys or not, but they were all Clays. Do you think you would give anything for a steer from one of them to make beef? No; they would not be worth any more than Brown Bessie, for they had the dairy form almost as good as Brown Bessie.

Mr. Heins, who was superintendent of the Short-Horn herd, said to me: "I tell you I am going to show you Short-Horns are not to be despised as dairy cows. We are going to give these other cows a close run, and—pointing to a cow, he said—there is a cow that is going to beat the whole crew. She gives more milk now than any cow, and makes almost as much butter." She had a splendid, great, fine udder; but I said, "Mr. Heins, if that cow is going to win, all my study of the dairy cow is gone for nothing." Then he said, "What do you think about it?" And I said, "She will go to putting on flesh and dropping off milking," and that is just what she did. She put on over 200 lbs. in weight, and, instead of standing at the head, she was almost at the foot of the list. She was not a dairy cow; that is the trouble.

You may have the best bred cow, and the best formed cow, but if you don't feed her right and don't take care of her right, you will not make anything out of her.

I want to talk about milking the cow. Milking the cow is really a fine art, and there are only a few persons who ever attain to be milkers in perfection. Do you suppose these cows that have made these wonderful records have been milked by ordinary men? Not by any means.

Of two Guernsey cows in the State of Wisconsin last year, by a faithful test, one made 912 1-2 lbs. of butter in twelve months, and the other 828 lbs., and the owner of

these cows says now that he almost lived with these cows most of the time during the year. These cows have just as much affection for the owner as a cow ever had for her calf. This is the secret of giving milk. Milk is the product of nature whereby the mother feeds her young, and love and maternal affection go with the giving of milk. No cow will do well for a man that she hates, and if a man hates a cow, the hate is generally returned.

You cannot make a cow give down her milk by hitting her over the back with a milk-stool, or by setting the dog after her. You have got to get down to the affections of the cow. You may think that is drawing things fine, but it is so. The most critical time in the life of a cow is when she has her first calf. Of course, I am not talking about your common cows, that are dull-headed and don't know much anyhow. My way is to have a heifer that is about to be a cow, in a box stall, bedded and comfortably placed. Some morning I go out there and find a little calf. Now, this heifer has been handled and petted and is nice and gentle before this; but when I go out there she is excited, and looks up at me and looks at the calf. One time when my wife was with me, I thought I would say something smart, so I said to her, "That heifer is trying to say to me, 'That calf is a daisy,'" but my wife said, "She is not trying to say that; she is trying to say 'Don't you hurt my baby.'" After talking in a soothing way to her, she soon got over the excitement, and I gave her a little warm water. Now the thing is to take away the calf, and to take the place of the calf, and the sooner the calf is taken away from the mother the better for all parties concerned, for she does not have as much affection for it as she will have later on. I have a box stall with one board up about 8 or 9 inches from the floor, then a board or plank 6 inches wide, set 8 or 9 inches above that. Going in the stall where she is, and I am talking very kindly, I quietly shove the calf under the bottom of that board. The heifer can caress the calf. While she is doing that I am petting her, and I commence to milk her, and she gets things confused in her mind, and don't know whether I am the calf or the other one. Now by doing that every single time I milk, have her caress the calf, we after a while get the calf out of the way without any trouble, and, do you know, she will give down her milk to me perfectly. Did you ever hear of a heifer holding back her milk from her calf? But lots of times you have heard of them holding back their milk from you. That is because you were not a calf. So you see it takes the utmost kindness, and really you have to love a cow if you are going to have her love you. Do you know the story of Mary's little lamb? You know the children said, "What makes the lamb love Mary so?" "Because Mary loves the lamb, you know."

Once I had a very promising heifer, indeed, and called her Brownie. Since I have seen Brown Bessie I think she resembles her very much. When she had her first calf I did not manage rightly. She was one of these very intelligent, highly nervous animals, one that requires the very best of management, and I made a mistake and let her have the calf till it was three or four days old. Then when I took it away and undertook to milk her, I could get no milk. I said to myself, "My Lady, you will be glad to give down your milk next time." She was saving for that calf, so I thought something must be done. I let her have the calf again. It went on one side and I on the other, and we formed a partnership and ran business very well. My idea was to crowd out the other partner and have it all to myself. I did so after a while, but never succeeded thoroughly. At times she did not give down the milk as well as she ought to have done, and, of course, that decreased the flow. She did not hold out as she ought to have done, and her period of milking was short. I tried to overcome that by feeding her grain when she was milking, but that is not a good way. You don't want them to be eating when they are milking. I want them to give milk with all their mind. I don't want them to be disturbed with anything else, but that was better than having her hate me. I kept her two or three years, hoping she would be better. Finally, I hired a German boy, 17 or 18 years old. He was a great lover of cows, and, for some reason or other, Brownie fell in love with that Dutch boy, although he was not handsome, and did not look any better than I did. That boy stayed with me two years, and during that time Brownie was the best producing cow I had. After he had been there two years he went up to Annapolis and worked there nine months, and then he got homesick and wanted to see the cows, especially Brownie, and started right away and ran off. My farm was out nine miles from the station. He left the train, and, although his father and mother lived half-way to my place, he never stopped to see them. After he had seen my wife and children he ran

out to the barn and Brownie came out to meet him, and you ought to see the tears run down that Dutch boy's cheeks. He cried "She knows me," and he fairly hugged Brownie.

Now, I want to emphasize the fact that if you can by kindness get on the good-will of a cow like that, she is going to do the very best for you, and unless you can get the good-will of her, she is not going to.

A man asked me once what would I do if a cow kicked me? "My stars," I said, "do you suppose a cow would kick me?" And he said, maybe not, but supposing she should kick the hired man. I said I would know how to solve that problem. The hired man has got to leave. No man can be around my stable that the cows hate so that they will kick him.

Some years ago I was travelling in Nebraska, driving in a buggy with a young man at the close of a beautiful June day. As we were going past a sod house a girl came out. She looked clean and neat, although she was barefooted. She had in her hand a bright, shining tin pail. She looked way off to the west, where on rising ground there was a large herd of cattle, probably 500 or 600, and as she looked that way, she said in a very musical voice "Come Suckie; come Suckie." I said to the young man who was with me, "Hold on, we are going to see something." We drove under the shade of a cotton tree so as not to attract the attention of the girl. I took out a map to pretend we were looking at it. In fact, I did look at it; but the young man was looking at the girl all the time. As the girl called in that way there was a Jersey cow stuck up her head and walked toward her, as fast as she could, and when she came up, the girl patted her on the head and said "O, Suckie; good Suckie," and put her arms around her neck, and the cow licked her, and they had a good time together, just as you see a cow with her calf. And pretty soon the cow squared herself around as much as to say "Take the milk," and so she went on milking into the pail. At first it went "ting, ting, ting" in the bottom of the pail, and then "perr, perr, perr" as it started to fill up, and pretty soon it was running over the top. She procured a good big pail of milk in an incredibly short time, and then she got up and patted Suckie, and Suckie started away two rods, and then turned her head and mowed to her, and the girl said "Good-bye, Suckie," and Suckie went off. Then I said to the young man "There is a dairy maid for you," and he said "You bet," and he kind of choked in his voice. (Applause and laughter). Well, now, I will tell you the sequel to that. That young man, who is not now so young a man, and that girl are partners; they have got some nice children, and they have the best herd, the best producing herd of dairy cows in the whole State of Nebraska.

Mr. DERBYSHIRE: You cannot blame the cow for coming when it was called in the musical voice.

Mr. GOODRICH: The voice has a good sight to do with it. When I was a boy they used to say to me "Don't swear or you cannot catch fish," and I say, don't swear in the stables about your cows. If you do, you cannot get all the milk you should, and a cow to do her best must be as comfortable and happy as it is possible to make a cow. She must have a comfortable bed of good straw, think of it just as if a human being were going to lie there. I tell you it makes my heart ache when I go into a stable and see cows lying on a hard cement floor, or hard plank floor. I feel like getting some straw and giving them a bed, even if they are somebody else's cows. You must have pure air and not have it too cold. You know you can make your barn tight and fill it full of cattle, and keep it warm, but they would be better to have cold air than impure air, with better ventilation. The air can be changed in the barn, and still not get down below freezing, and I would not like to have it go below 40 above zero in the coldest of weather. There should be ventilation enough so that you could have good, pure air. A great many men are trying Professor King's method of ventilation. The pure air comes in at the top, and the foul air goes out from the bottom. The foul air is at the bottom, and that is the coldest air. Governor Hoard is building a new barn and is making it the same way.

Mr. DERBYSHIRE: You have not said a word about the sun shining in these stables.

Mr. GOODRICH: No. You do not want a dark stable. They need air and light. A great many stables are made too dark.

Then there is the question about watering that is worrying a great many; some water their cows once a day, some twice a day, some turn them out to be watered, and some water them in the stables. If we can have the water in the stable so they can drink water at will, and have the water clean, that is the best way. One of my sons

built a barn which held 76 cows, and he had the Buckley water device which took 38 basins. The first time I saw him after he had them put in, he said "Now I know when a cow wants a drink," and I said "When is that?" He replied, "Every time after eating"; but they say that is not the way with a horse. Horses have different stomachs to cows; every time after eating is the time the cow wants to drink. You know that when a cow eats hay and dry fodder she only puts it in a sack to keep it so as to eat it at her leisure. She has not eaten it any more than I have eaten a bag of apples when I carry it on my shoulder. She would starve to death if she could not raise it from that stomach and eat it over again. It has got to be floating in water so that she can raise her cud, and therefore she needs a drink after eating, or else drinks a great deal more than she ought before eating. So, if you arrange so that your cows can have good pure water after eating, then you have the thing just right. (Applause).

The CHAIRMAN: Mr. Goodrich has given us a wonderfully instructive address, and I am sure we will all profit by it. I have now great pleasure in introducing to you Mr. Derbyshire, President of the Eastern Association.

ADDRESS.

BY D. DERBYSHIRE, BROCKVILLE.

I am delighted to be with you, and I thank this Association for the invitation, and desire to say that I feel delighted that you sent the President of your Association to attend the Eastern Dairymen's Association. It is the first time in the history of our Association that your President has attended to see what we are doing, and to get a little idea of how business is done in our lower country, from that far distant land. I was delighted to see him there. He took part in the meetings and assisted us in every way, and I am very sorry indeed to learn to night that he is not well.

There is one thing more I feel pleased about, and that is the unity of your force. Everybody that is interested has come together in one Association to run the business in a business way. I feel proud to think you are big enough in the western part to come together and drop any little differences you might have. All of you cannot be president this year; that is the reason they want three or four associations so that there might be more officers. We want more unity in connection with agricultural work in every department.

The man on the farm producing milk ought to be united with the other forces. I think if I was a young girl I would search after this old gentleman who spoke to you to-night. He would be my style of a husband. He gave us a beautiful address, and if that address was looked into carefully, what a world of good it would do throughout the whole Dominion. If everyone could just take these things into his heart and put them into practice it would improve this Dominion wonderfully. To get at this cow you must get at the farmer. You cannot have a cow or a cheese factory or anything else without you can get hold of the man first.

I am delighted that the Minister of Agriculture is here, because he has done so much to try and get at these very people. We have the Agricultural College at Guelph, and then he has developed the dairy schools, and put everything within the reach of every farmer, so that he could be qualified to raise the style of cow that our friend talked about to-night, so that the farmer can know something about the business from the foundation straight through.

The Minister of Agriculture addressed us at our Eastern Association, and it warmed our hearts to think we had a man that had the money behind him ready to assist us in our work. He is watching just what we are doing in all these associations. He is keeping his eye on us to see that we are doing the work we really ought to do. Sometimes I get discouraged in the work because the farmer who is furnishing the milk to the factory is so slow.

One of the greatest lessons I ever got was at a cheese factory. I said to the secretary, "Get us a blackboard and let us get down the names of some of these men that are furnishing milk to this factory." There were 102 patrons. It was a well established factory; everything was in perfect condition. We found there was one man furnishing milk

to that factory who was getting $65 per cow, and we found another fellow who was only getting $25 When I got up to talk I had all this information, and I commenced to rake the farmers over. What was the matter with the $65 man? How could he get so much milk to the factory? And what was the matter with the other coon that only furnished $25? We came to the conclusion that it cost $30 to feed a cow and pasture her, that it was going to cost $30 to take care of the cow and keep her alive. We found from the $65 man that he had bought $10 worth of feed per head, bought bran and shorts, and had a silo, so that one man lost $5 and the other gained $25

What do they do with the iron in those factories where it is cast? They put them into a box and turn them around, and they clink together and rub the corners off the iron and brighten them up, and that is what ought to be done in every factory in the Dominion Get these farmers together and educate them, show them that a cow in a dark stone stable cannot be healthy. I saw such stables while coming up on the train, with little windows in them. There is not a cow in the world that can live in a dark, damp, cold stable and produce milk to make money. This cow, "Brown Bessie" would starve and die in such a stable. If we are going to be better our condition as farmers and dairymen we must get hold of the man that makes the milk. He will make the cow and make the stable, and make the cheese factory, and he will make the Dominion, if you can only educate him.

ADDRESS.

By Hon. John Dryden, Minister of Agriculture for Ontario.

I am very glad indeed to meet you at this convention on this occasion, and the reason I am pleased to be with you is because you represent the men, connected with this dairy industry of Canada, who are adding millions of dollars to the wealth of Canada; wealth that did not exist before and could not be created in any other way. I am very sorry to say that I cannot be of any great service, except it be that what I have to say may give some little inspiration to the workers of one, or several, departments connected with this industry; or perhaps I may be able to arouse among you a little greater enthusiasm in carrying on this industry. I am not a practical dairyman; I have never made a pound of cheese in my life. I have bought some, but never sold a pound And if you were to talk about the manufacture of butter, while I would like to say I think I have improved the quality of the product in this country by things that have been done through this Department, when it comes to the manufacture of it and you ask me to take hold of it, I think I should be inclined to introduce my wife, who would be considered a good deal better in connection with that work. So that I cannot speak to you from any practical experience. I would rather come to you as my friend, Mr. Derbyshire, here says, as an onlooker. It is my duty to watch this convention to see what the results are, and I am looking on from an outside point of view, but if I am an onlooker I think I am public spirited enough to be able to see our agricultural products take the first place in the markets of the world. Now, how is this to be done? You take the dairy industry. You cannot centre it as a great establishment situated at any particular point, with its general superintendent, its manager, and its foreman of each department, as they do in other manufacturing lines. If you could do that you could control it a good deal more easily than you could do as it is now. The business must be conducted as it is to-day by hundreds of our people scattered all over this Province, in every township and county, individuals working in their isolation it may be, and if we are to do good work and bring about the results that we desire, it must be that because all these persons are working in the same way, and they have before them the same goal towards which they are reaching. It is a race in which every single man can win a prize, and nobody need be left out. It is not that I shall get ahead of you, or that you shall get ahead of me, but every one of you will get a prize. Now if we are to do this, I must submit there are three things we must do—we must organize; we must instruct; we must co-operate. You have four lots of people. First, you have the farmer, producer of the raw material; then you have the manufacturer, the man in charge of the various factories; then you have the dealers who have their part to play; then you have the transportation companies of this country through whom your

products have to meet the best markets in the best condition. Now the farmer is the first person to organize, and this has resulted in the erection of factories all over the country in which this industry is carried on. The moment these factories are erected comes the question. "Who shall be put in charge?" and in order to provide that, comes in this consideration 'your part of it' and my friend, Mr. Derbyshire, is right when he says we have undertaken the means of giving instruction, so as to present to your young men the proper equipment to take charge of these factories. I remember a time, ten years ago, when we were sending our young men to the United States as the only place where they could find this equipment. I told my colleagues this must not be, this rich Province ought to provide the place where they could be able, in our own country to secure the necessary equipment; and so we established our dairy schools. First at Guelph, second at Kingston, and later at Strathroy. These three schools propose to furnish instruction to the pupils who desire to undertake the particular work that you have to do. Having gone that far there is still another step, and it has been referred to here to-night, These farmers who are producing the raw material need instruction also, as well as the manufacturer. You will remember at the last session of the Legislature I asked that body to increase the grant to these two Associations, east and west. The speaker of the House who is here said that the increased grant must be given for instruction.

I have spoken of organization. Now the farmers need instruction as well as organization, and they must have it if they are to do good work. Then comes the dealers, and I want to say that they don't need any instruction at all, and they don't require any organization so far as I am concerned, or you are concerned. They are perfectly competent to look after themselves. Nevertheless they are important factors in reaching this goal towards which we are aiming, and we do not want to forget that. We are glad that they have energy and enterprise enough to take hold of this work, and I want to say to you that they are not in it for the fun that is in it, and that they are therefore anxious to see that you do good work, so that they can make a great deal more money out of the product. Then I suggested another class of people, the railway companies and the steamship companies. These people are the hardest-hearted people of any you have in the country. There is no doubt about it. They are interested, not so much in the quality of the product as the quantity. How many tons have you got to send? How much can we get out of it? How much is it worth? And they will study all of these questions with a view to getting out of this industry all that is possible for them to get out of it. Yet after all they are susceptible to reason, and I have found that it is quite possible to interest them in the country and in the country's products. If you are able to say to them, "We are engaged in carrying on an industry which is adding year by year, millions of dollars of wealth to this country and we want you to help us to perfect it." I have found them respond and they say, "What can we do?" "What is it you want?" Now I want to say to these people, we want you to co-operate with us if we are ever to accomplish exactly what you are after in this matter. I have in my pocket a watch, I value it greatly. It was a present to me. It is an exceptional good one, and I can depend upon it in cold weather, hot weather, at home or abroad. It never loses time. I have therefore learned to have confidence in it. When I open that watch I find a multitude of wheels, I do not understand them at all, but I know perfectly well that if one of these wheels loses one single cog the whole thing is out of gear, and I have lost confidence in it. I have just mentioned my watch to show you that these people gathered together in connection with this industry are exactly similar to it; they must all co-operate if we are to accomplish good work. Each one must do his part. The man who lives on the farm is the man who holds the key to success. You cannot reach success without that man on the farm. He is the most important factor of the whole combination. If he gives you bad raw material, I am afraid no skill or experience in the factory can help you to make out of that a good product; therefore the man on the farm is the man who holds the key to the whole situation. Now, what I want to say about this man on the farm is this: He does not look much; sometimes he walks rather stooped, and he has not got a quick gait; but he is not the fool that you take him to be. Now don't try to punish him too much when he goes astray, and don't turn up your nose at him and sneer at him. I suppose most of us who have lived on farms have tried to drive a herd of swine to where there is lots of feed for them, and have got them near the gate, and think it is all over; then we get in a hurry and crack the whip, the hogs give a grunt or two and a scamper, finally

get all rattled and run the wrong way and clean over you, and away they have gone—and you never get them in that day. What would you do? I would put a bunch of peas under the gate, put the gate fast, and when they had got their noses through to get at the peas I would leave it that way, and before morning they would get their noses under the gate and root it off and walk in of their own accord. I do not want to say that farmers are like swine, but human nature is about the same, and resents too much coercion. The farmer can see the benefit of an extra dollar, if you can show him how he is to get it. I therefore submit that it is only doing justice to yourself and to the best interest to all concerned, that you should try to show him some better way, and to try to bring him all the education you can. If you can show him that there are a few extra dollars over the fence, he will soon find the lowest panel and get over and get it. So, therefore, let us remember that with all these different elements, what is wanted above all else, is fair dealing with one another; faithful work all along the line, commencing with the farmer and going through with the manufacturing and transportation companies. What we want in this country is honest service. There is not a man who is looking me in the face just now, who has not got some reputation in the township in which he lives. How did he get it? He got it by looking after little things; doing little things in his life in a proper way, all along right up to the present moment; and there is not a young man here to whom I would not say, "Don't forget that you are making a reputation every day you live, although you may not realize it, and don't forget that reputation is worth a great deal to you; and don't forget that it will go ahead of you everywhere you go." It has taken some of us probably a lifetime to work up to this reputation; we can lose it in one day. You may have done your duty well all through, and people may speak in the highest terms of you, but just one false move will dash it all to pieces, and your reputation is gone. It is just the same, so far as this country is concerned. We have made a reputation for our cheese. It has taken us a great many years of hard work, and hard service to work up to it. We have captured the best market you can find in the world, but notwithstanding the great reputation we have, we can lose it in a year. I was at the Eastern convention and heard some very strange things. I heard about a man putting something inside of his cheese and then covering it up. I am ashamed of such a man. Of course we have heard of filled cheese in the United States, and Governor Hoard was down there and heard we were doing the same trick. A man who does a trick of that sort deserves all the contempt you can put upon him. He is not merely injuring himself, but he is injuring you, and injuring his country. What I plead for in connection with this industry is honest service. Let the farmer remember that when he is trying to put something in his milk that didn't belong there, while he may take one dollar to-day, it may deprive him of one hundred dollars next year. I want to appeal to you as to those who love their country and realize that they can do something to advance it. Do not let us lose the reputation we have gained. Let everything be done to build it up. Let your motto be, "What we have we'll hold." (Applause)

The CHAIRMAN: I am sure I voice the sentiments of the entire audience when I say we are delighted with the remarks of the Minister of Agriculture, and that the instruction he has given us, and the words of encouragement he has spoken, will help us greatly in our work.

CARE OF MILK FOR CHEESE-MAKING.

BY J. MACHOOVER, SPRINGFIELD.

This subject might be classed as one of the most difficult to handle in a satisfactory way, from the fact that year after year, all of the principal points in connection with it have been thoroughly gone over, so that what is left to me is simply to repeat and revise to some extent. However, we all realize the importance of good flavored milk in the production of cheese and butter, and simply to repeat good things will, I trust, not all be lost.

We must first start with the cow. I think it very important that every means possible should be used to keep the cow healthy. I am convinced that a great many of the flavors foreign to milk can be traced to the disorganized state of her constitution,

caused by improper care, feed or water. So much has been said in regard to the care, feed and water for cows, that it appears almost useless for me to say anything more; but it seems necessary to keep these facts before the milk producers, intelligent men as they are. I feel confident that they will continue to remedy the defects in their milk until we will be supplied at our factories with a much better quality.

How are we to do it? All foods or water taken into a cow's stomach have an influence on the flavor of the milk. How necessary, then, that food should be fed that will not leave any trace of taint. Normal milk contains somewhere about 87 per cent. or in other words 87 parts, water, and 13 parts solids. This should convince any milk producer of the great importance of giving cows nothing but the very best of water. Every cheese maker should continually try to impress the milk producer with the great importance of giving the cows food and water pure and wholesome. Cows should always receive such water that you would not refuse to drink yourself. Many bad flavors in milk can be directly traced to filthy water. If cows are always forced to drink, and produce milk containing 87 per cent. water, from the stagnant pond, how could any reasonable man expect pure milk from such water? No farmer sending milk to a cheese or butter factory should allow a pond on his farm, nor should he allow his cows to drink from such. I can look in the near future when the Boards of Health will see that farmers do not allow their cows to drink impure water. We have the law to-day in some other matters of less importance perhaps. As I stated before, food also has a great effect on the flavor of milk. To illustrate it, we all know how quickly the turnip flavor is transmitted to the milk from turnips fed to cows. Just so with all food to which the cow has access. The extent of the flavor will be noticed by the strength of the flavor in the food fed. How necessary, therefore, it is, if we wish to get a good flavored milk, to be very careful in feeding nothing that will leave a trace of a taint. Turnips should never be fed to cows giving milk, although we have some dairymen who persist in feeding turnips, to the detriment of the article manufactured. I do not think it possible to feed turnips to cows giving milk without sooner or later contaminating the milk.

Turnips are not the only objectionable food the cow gets that produces very bad flavors in the milk. Cows allowed too much green clover will certainly produce tainted milk. Again, cows often, when grazing in uncleared land and in fields where there has been all kinds of foul weeds allowed to grow, when grass is scarce will eat the weeds, and then soon we find very objectionable flavors in the milk. As far as possible, all foul weeds should be cut down and destroyed before allowing the cow to have access to the field. Water and food have a direct influence on the flavor of the milk the cow produces. How necessary, therefore, for the dairymen to see that, so far as it is possible, the cow receives nothing but pure water and food that will not leave a taint.

After brushing the udder thoroughly to remove anything that might be adhering to it, and that would likely fall into the milk pail, milking should be done with dry hands. Remove the milk immediately from the stable, strain and air it in a pure atmosphere. Never think of leaving the milk until thoroughly aerated, and cooled to at least 75 degrees Fahr. If you can cool the milk to the required temperature by airing in any way, such as dipping, pouring or using an aerator, so much the better, but if you cannot, by all means cool it with water around the outside of the can, not inside, as some prefer to try. I think that hanging milk in pails to a pole in pure atmosphere is a splendid system. The air has a good chance to cool the milk. I always try to induce my patrons to keep their milk in as small quantities as they can conveniently. If they have a number of cans put some in each can, and in the morning put all of the cold milk together, but never add the warm milk to the cold if it is possible to avoid it. Milk should always be aired thoroughly as soon at through milking, and see that your milk is down to at least 75 degrees Fahr. before you leave it. This temperature is less favorable to the bacterial growth in the milk, and to a large extent, prevents many bad flavors developing. It would be otherwise if the milk remained warm during the night. This temperature is sufficiently high to assist the ripening process.

Throughout the country, during the warm months, tons of milk are lost, and perhaps tons manufactured in the factories, called fast working milk, at more or less loss, whereas if the same milk were cooled by some method, a great many dollars would have been saved, and especially in very warm weather, it would have assisted the cheese maker to make a better article of cheese.

The time is near when the milk producer will have to furnish a uniform quality of milk, day after day, regardless of weather, and seeing that the milk is uniformly cooled will go a long way in the direction of uniform quality.

I cannot speak from a scientific standpoint, but can from a practical. One of my patrons strictly follows the system mentioned. He is particular and careful in feeding and gives nothing but pure well water to his cows. All utensils are scrupulously clean. His milk is thoroughly aired and cooled to 75 degrees Fahr., just as soon as milked. The morning's milk is treated exactly as the night's I have had competent judges examine his milk, who always pronounced it first-class in flavor. And the one great satisfaction of it was, it always came in the same, regardless of the weather. During his four years' patronage to my factory his milk was uniform. Some patrons deliver milk which varies like the moon. To-day it is very fair, but if we have a hot night the chances are his milk is returned. The cause is inattention to airing and cooling. If one patron sends uniform milk, all can. I claim that by holding milk over night at a uniform temperature, by seeing that the cows are given nothing but pure, wholesome food and water, and by strict cleanliness in milking and in the utensils used, we can make one step at least in the direction of uniformity of the quality of milk sent to the cheese factories.

Mr. W. WADDELL: I have paid a great deal of attention to this subject and have followed it closely now for 30 years. Some of you who were at the convention at Ingersoll, will remember that I gave a paper on "The Care of Milk," and some of the younger men came after me and handled me severely for the stand I took on the protection of flavor, so I was very glad to hear yesterday that Prof. Dean bore out what I said last year. What I have proven is, that we cannot produce flavor in milk or cream at too high a temperature. If we raise the temperature too high we make a proper breeding ground for the growth of the bacteria that is very injurious to the flavor, and therefore I contend in milk for cheese factories we should have more cooling of the milk than we have. It is not necessary to cool the milk in cold weather, because the milk often becomes too cold, but, if we can get our patrons of cheese factories to cool the milk to 70 degrees or under in hot weather one of the greatest troubles we have in making cheese would be removed. A great many of the bad flavors we have in milk have been found to have come from cows out of condition. When you find a man sending bad milk to the factory, go to his place as I have done many times, and you will find some cow in the herd has got injured in some way and is giving bad milk. I have traced bad flavors to this many times. The cheesemaker makes a mistake when he doesn't go and endeavor to find out what it is that causes these bad flavors. It is quite possible the patron has tried to do what he can, but he doesn't know where the trouble is. Sometimes it is a dirty strainer that is causing the trouble. If you will remember, in the Advocate a little over a year ago, a very prominent dairymen wrote and said, "Turnips could be fed without injuring the milk." I thought at the time this was a very bad thing to put out to the dairymen in a paper that has as much authority as the Advocate. Although it might be true that this man fed turnips, I contend it is not possible to give that out to patrons of cheese factories and not injure the milk. This man may have fed turnips without the flavor being detected because he might have been very careful in handling it, but there is no use in telling patrons that they can feed turnips and the flavor not develop some time. In the address we have just listened to the speaker addressed you very ably on the subject of the food and water that cows should have to enable them to produce good milk. This is all very true, and I would like to emphasize the fact that they must have pure food and pure water, and in the winter time I think the cow should have pure air to breathe. Unless the stables are properly ventilated it will injure the quality of the milk. Another thing referred to was the fast working milk. If we could get the amount of cooling necessary we would do away with a great deal of that fast milk. Although we are not able at the present time to give the exact loss, I think if we could do away with that fast working milk we would save many dollars to patrons in factories. In this country there is a great loss in milk that works too fast. The speaker advocated cooling the milk to 75 degrees. I think 75 is scarcely low enough to produce good flavor. I think the milk should be cooled down to 70 degrees, in hot weather especially, and in making a starter I contend the ferment should never be added to the starter at a temperature above 70 degrees. If it is added at a temperature above 70 degrees I claim the undesirable bacteria that is in the cream or in the starter will grow much faster than the kind of flavor you wish to produce.

Mr. MacFarland : I will tell you how to keep the milk sweet in the summer time. If you milk without letting the foam rise you are all right. If you milk so that the foam rises the cream has risen before you are through milking, but if you keep the foam down and keep your milk cool, if it weighs 100 pounds Saturday night it will weigh 100 pounds on Monday morning. It is the man who makes all the bad flavors in the milk. That is all I will tell you now. You may get some more later.

A Member : What do you consider the best way of cooling the milk ?

Mr. MacHoover : If you can cool it down in any way without water. I think it would be better, but it seems almost impracticable to cool down in any other way in hot weather, and the only way to do is to have water around the outside, and, if necessary, have a little ice to lower the temperature quickly. I would not advise going much below 70 or 75. I do not think it should stand above 75.

Prof. Dean : What is the objection to cooling below 75 ?

Mr. MacHoover : Simply the ripening process. I think some nights are to hot for the milk to keep at its best.

A Member : I have noticed that in putting the milk into a tub of water that the water and the milk both come to the same temperature, and the cooling process then stops. Would not it be better to cool it without water, so that the cooling process would still go on ?

Mr. MacHoover : If you had any other method of cooling it I would adopt it, but whatever you do, I think it should be cooled quickly.

Prof Dean : I had a galvinized iron box made, two feet deep, large enough to hold six cans. We set the cans of milk, as soon as the milk comes from the dairy stables, into this tank of water. In very hot weather we put in some ice, but in ordinary weather we do not, as we have a continous water supply. We have a pipe in the tank, and the warm water runs over and runs away into the drain, so we simply let the ordinary stream of water run into the tank, and the warm water overflows. The farmer who has a windmill can let the water run around the can of milk all night. To my mind that is the most practical way of cooling milk, and, as I understood yesterday, I think we will have to get the patrons to cool the milk to 60 degrees. If the patrons would cool their milk to 60 the cheese maker would receive from the patrons a uniform quality of milk. At the present time a cheesemaker never knows what kind of milk he is going to have to work with until he gets started. It is a Chinese puzzle for him to know what kind of milk he is going to get. Some patrons keep it in a warm place, some air it, and some do all kinds of things with it. If all the patrons would cool their milk to 60 degrees, and if the cheese makers would use the culture, I believe we would advance five years in the matter of making a uniform quality of cheese. A great many patrons in the spring send to the factories what is known as colostrum milk. It is wholly unfit for cheese making, and from some experiments we have been making in the past five years, I am led to believe the milk is not fit for use as soon as we have been led to believe. Usually the farmers say the eight or ninth milking is all right. That may be true in some cases, but in many cases the milk does not become fit until the 10th or 12th. I think a great deal of the spring cheese being bad is caused by the patrons sending this colostrum milk. It contains a great deal of what the chemists call albumen, a substance closely allied to casin or curd. The albumen in the milk does not cure into cheese, and a great deal of the flavor we have in the spring cheese is owing to the patrons sending this colostrum milk, that is wholly unfit for cheese making.

Mr. Bell : Has Mr. MacHoover ever been able to trace bad effects on cheese to feeding green clover ?

Mr. MacHoover : I do not know that I have, but I have had some objectionable milk that I have returned, that was received from cows fed too large a feed of clover.

Prof. Dean : First or second growth clover ?

Mr. MacHoover : I do not know.

Prof. Dean : What time of the year would it be ?

Mr. MacHoover : Early in the spring. I have found that, whenever the cows were allowed too much clover the first feed, it had a bad effect.

Prof. Dean : Don't you think a simple remedy for that would be for the farmer to turn them into the clover field for an hour or two at first, and then take them out, and get them gradually used to the clover ?

Mr. Bell : It is a question for the cheesemaker, as to whether he should return that milk. I have never detected it in the cheese. Farmers could hardly avoid a thing of that kind.

Mr. MacHoover : I do not like to take in a can of bad-flavored milk.

A Member : Do you think it necessary to aerate milk of that kind, instead of cooling it?

Prof Dean : I think, when you have flavors in the milk caused by feed, that aeration would do some good, because these flavors from turnips and clover, and so on, are due to what is called volatile oil. When you go along by a clover field or an apple orchard in blossom, you have a pleasant smell, and that smell comes from what is known as volatile oil. This volatile oil will more easily pass out of the milk when exposed to the air. To my mind, that is the only cause that I know of where aeration is of any special benefit, except the cooling the milk gets during the aeration. I think the better way is to prevent that geting into the milk. Farmers should be advised not to allow cows in the clover all day. Our own practice is to turn them in for an hour or two at first. For the sake of the cow, and for the sake of the milk, I do not think it is safe to leave the cows in fresh clover, or in green pasture fields, for any length of time, especially when they are hungry.

A Member : Can you tell us anything about rye for spring pasture?

Prof. Dean : I have not had any experience with rye, but all the reports I have had say that it tends to taint the milk, and therefore I do not think that the dairymen should use it.

Mr. Waddell : I have never been able to trace the flavor in cheese so far, but I have detected it in the milk.

A Member : What effect would sulphur water have on milk or cheese?

Prof. Dean : I imagine that if cows drank sulphur water it would taint the milk, although I have had no experience. I presume you met that in Essex county or in Welland. In gas producing districts you very often find this sulphur water. When we were out with the travelling dairy I know that in these districts we had difficulty in getting water to wash the butter with. It always left a taint on the butter. I think there would be a risk if the cows had to drink it. Of course, in some cases, the cows have to drink that water or nothing.

A Member : I would like to ask about feeding apples in the fall?

Prof. Dean : We made some experiments this last fall by feeding apples to cows, and the result was reported in the press. Feeding apples to cows gives a decidedly apple flavor to the milk, and to the cheese and to the butter, and I would say, as a rule it is not safe to feed these so far as flavor goes. And, further, we found apples fed to cows tended to decrease the quantity of milk given by the cow. I am satisfied apples are not a food that a dairyman should use. Apple pomace, or the by-product in the manufacture of cider, tended to increase the quantity of milk, but the flavor was so bad that I would not advise its use.

Mr. MacFarland : Was the apple pomace sweet flavored or sour?

Prof. Dean : We got the apples from the orchard and ran them through a turnip cutter. They were mixed apples, sweet and sour.

PREPARING A STARTER

By Moses Knechtel, Sebringville.

The starter is a very important factor in connection with cheese-making, being used for the purpose of developing lactic acid and controlling the flavor of the cheese.

In preparing a starter it is first necessary to procure a mother starter, which can be obtained by selecting good milk of good flavor, and allowing it to sour, or by purchasing pure culture.

In all cases it is advisable to pasteurize the starter, and it is necessary to have suitable cans in which the milk can be easily heated and cooled. I would prefer having two cans, one setting inside the other, and care should be taken to have the same properly soldered, and the cans kept perfectly clean.

Select the desired quantity of good milk, say 100 pounds, and add about thirty-five pounds of good water. Then heat to 160 or 165 degrees, keeping the milk in motion. While heating keep it at the desired temperature for thirty minutes and stir it occasionally. Do not cover during this period. Then cool to 70 or 75 degrees as quickly as possible and add the mother starter, about six to seven pints, and thoroughly stir. Then it should be covered up and put away and not be disturbed until required for use. Then skim about one inch off the top and break up thoroughly before using by pouring from one vessel to another.

When you pasteurize you have no difficulty whatever in having a good flavored starter as long as you take good care of it.

Mr. A. T. Bell : This question of starter has given rise to a good deal of controversy among cheese men, and I would like to see it well threshed out at this convention. Some have gone so far as to say it has been a curse to cheese-making. I think the reason is that it has not been used intelligently. I think a starter used properly is a blessing. In the hot summer weather it would be foolish to use it in the majority of our factories, because we get the milk fairly ripe when delivered in the factory, but when the milk comes cool and sweet in the summer weather it is necessary to use a starter. We all know that the milk when it comes from the cow is too sweet for cheese-making. Then, I say, it is necessary to use a well-prepared starter, and you should have suitable cans provided for the preparation of that starter. Have it pasteurized and everything kept clean and sweet, and there will be no difficulty about it when it is used intelligently.

We have used the same ferment since a year ago last June, about seventeen or eighteen months. In the summer time there is often a long spell of weather, when we do not require to use it, but we still prepare it so as to keep the same ferment along. We have been able to keep it that long and I think it can be propagated indefinitely by using care in the preparation. We use cans similar to shotgun cans. We have tried cans similar to what Mr. Knechtel speaks of, but we prefer the smaller cans. We pasteurize the water with the milk. If you disturb the starter, and do not require to use very much of it, it is not a good plan. It does not do it good to be disturbed. We divide it up into small cans. Sometimes we do not require to use more than one can at a time, and therefore do not disturb more than what we require to use.

Mr. Morrison : I would like to ask Mr. Bell if he does not think that keeping a starter in small quantities would not be the same with keeping milk. I have noticed makers who keep 100 pounds of starter in a can, who have a great deal more trouble in keeping it right than they do where they keep it in small cans.

Mr. Bell : I know that is the case. We never had any trouble since we started using small cans

A Member : At what temperature do you add your starter ?

Mr. Bell : When it is cooled down to about 70.

A Member : At all times do you add a ferment to the starter ?

Mr. Bell : Sometimes we have waited a little while, when we thought it was a little sweet, before adding the ferment, but usually we add it as soon as it is cooled down. In the summer time it requires very little of the ferment. And often, when we only use one small can of starter, we just set it in another can and get enough water around it to cool it.

Mr. Clarke : Would you advise using a starter where the milk works enough without it ?

Mr. Bell : No, I would not advise using it in that case. A man must use a starter with good judgment.

Mr. Clarke : About how long do you think the milk should set in the vat before the starter is added ?

Mr. Bell : I do not think a vat should stand more than an hour before it is set. If it is going to be longer than that, I favor using a starter. The cream is always rising to the top. Be as careful as you can you are losing some if you have it too long, and I would say not more than an hour after you have the vat heated up it should be set.

Mr. Clarke : Don't you think it would be advisable to leave it three quarters of an hour after you cooled it ?

Mr. Bell : I like to set my vat in a half hour after it is ready. I don't think there is any advantage in leaving the vat half an hour unless you have to.

Mr. MacFarland : What is the reason that the cream rises on the vat ?

Mr. Bell : When the milk is heated to a certain temperature the cream rises more rapidly.

Mr. Morrison : I notice in Mr. Knechtel's paper that he advises putting in six or seven per cent. of the old starter, but I think that is too much in the summer time.

Mr. Knechtel : I have not found it so in my experience. I have been using that per cent right along, and have not found my starter get any way sharp.

Mr. Morrison : I think with six or seven per cent. you would find it too sharp.

Mr. Knechtel : I have not found mine that way, and I have carried it over two or three days.

Mr. Morrison : Do you use as much on Saturday to carry it over to Monday ?

Mr. Knechtel : No, I put less in then.

Mr. Waddell : I think good judgment is one of the best things we can get in the preparation of a starter. I have found adding ferment is one of the main things. If we put in too much ferment we spoil our starter. We must use just enough ferment to develop the acid to the proper stage. If it goes beyond that I think the starter is injured. Another thing mentioned here was the heating of milk for cheese-making, and that letting it stand at a temperature of 86° was too long when it is heated up to that temperature. There is always bacteria in that milk that we do not want developed at that temperature. It is not the kind of bacteria that we want for flavor, but if we heat that milk up to 86°, and have a little good starter in it, the starter overcomes the bad bacteria, and the proper bacteria is more apt to grow, whereas, if we have no starter in, the bad flavors develop rapidly at that temperature. For that reason I think it is a mistake to let milk stand at that temperature too long without adding some good starter.

Mr. Morrison : How long do you leave the milk, after you have it heated up, before you add the starter ?

Mr. Waddell : I would add it at once. In fact I would add the starter before I heated it up.

Mr. Morrison : If you thought the milk would set in half an hour would you add the starter ?

Mr. Waddell : Not unless I knew I had bad flavored milk that I thought I could overcome with good starter, then I might add it.

Prof. Dean : There is one point in the propagation of the starter. When you get good culture from the laboratory, if you put three per cent. or five per cent. in a large quantity of milk, often the starter does not work properly. Our boys have adopted the plan of just putting a small quantity of the mother starter into a quart of the milk and give it a good start there, and then add that to the larger quantity We have found that to work satisfactorily, and have found that by putting a little of the old ferment into a large quantity of milk sometimes the germs do not work properly. Mr. Bell has carried his culture a year and a half. That is longer than we have ever been able to do in our dairy department, and I think Mr. Bell must have exercised exceeding great care to carry it so long. That is one of the great secrets in having uniform quality of cheese, having the same ferment and getting the same flavor day after day.

MILVERTON EXPERIMENTAL AND ILLUSTRATION STATION.

By Arch. Smith, Experimentalist for 1900.

The object in establishing the Experimental Station was to demonstrate to makers and factorymen the best method of converting an old building into a first-class, up-to-date cheese factory, with fittings and equipment to correspond, and to establish a place where experiments could be carried on, for the benefit of makers having any difficulty. Also to illustrate best methods of making cheese to all who might care to visit the factory, and to furnish makers with a good quality of starter in order that the cheese of this Western district might be of a more uniform flavor, and to devise means whereby the washings and sewage from the factory could be disposed of in an effective and economical manner.

A great deal of time was spent in the spring and early summer refitting the factory and equipment, and in putting in a sub-surface system of drainage. The factory was

white-washed both inside and out with the white-wash recommended by the Association, which gave it a much better appearance. The wood work of the make-room, vats, curd sinks and presses were all repainted. A cement floor was put in the boiler room, and a galvanized steel hot water tank and wash sink replaced old ones, the hot water tank sink being suspended from the ceiling and the wash sink directly under it. The curd sinks were also painted on the inside, which prevented them from becoming whey-soaked and made them much easier to clean. The steam and water pipes were painted with silver bronze or aluminum, which added very much to their appearance and durability.

The whey was not returned to the farmers, and the cans were thoroughly washed and steamed at the factory, which enabled them to furnish milk of a better quality. The greatest difficulty we had with the milk was that some of it was carried a long distance, and did not arrive very early. It was consequently sometimes overripe, which made it more difficult to make fancy cheese.

A great many makers and factorymen visited the station during the season and carefully examined the system adopted for disposing of the sewage, and all expressed their approval of having the privilege of examining the experimental cheese and decide for themselves the results of the different methods of making.

The milk used for experimental purposes was first put into a large vat and was then taken out and carefully weighed and put into two smaller vats, holding 2,000 lbs. each. A number of experiments were carried on at the suggestion of cheesemakers, who wished to know the difference in the quality of cheese from washed and unwashed curds, and by washing curds at different temperatures, and by the use of starter when unnecessary, and to determine to what extent the allowing of milk to sit in unclean places, and the use of dirty utensils, affected the quality of the cheese.

Washing Curds. Considerable time was given to experiments with washed and unwashed curds, the results of which proved that washing is an advantage, as it slightly increases the yield of cheese per pound of milk, gives better flavor and texture, makes it easier to make a uniform quality of cheese and greatly improves the keeping quality.

In the early spring a number of makers have considerable difficulty by farmers furnishing milk which was too new or too soon after parturition, but on account of the lateness of the season before starting, we were not able to secure very much new milk (colostrum) consequently our experiments were not so exhaustive as we would have wished them to be. In each case the milk worked faster, and the curd was somewhat slimy and rougher in texture than with ordinary milk, and would not stand so much acid without injuring the cheese. We found it an advantage to draw off the whey at the first indication of acid, and to mill early, giving not more than $\frac{3}{4}$ acid and using $\frac{1}{8}$ oz. more salt per 1000 lbs. of milk. In each case the curds were inclined to lose too much butter. There was very little difference in the flavor of the cheese made from milk containing colostrum and from good milk, the greatest difference being in the texture.

The scale of points adopted was: Flavor 45, Texture 30, Color 15, Finish 10; maximum 100.

	Flavor.	Texture.	Color.	Total.
Milk containing Colostrum	43	26	15	94
Good Milk	43	29	15	97

During each month of the summer a number of experiments were made with washed and unwashed curds, and washing curds at different temperatures.

The experimental cheese were scored by cheese buyers and makers who visited the factory at the end of two weeks, one month and two months and the average of their scores taken.

Washed after milling with water at from 94 to 98 degrees:

Kind of Curd. Time.	Lbs. of Milk per lb. of Cheese.	Flavor.	Texture.	Color.	Finish.	Total.
		45	30	15	0	100
Washed two weeks	10.65	43.5	29	15	10	97.5
Unwashed two weeks	10.68	43	28	14.5	10	95.5
Washed four weeks		43	38 5	15	10	96 5
Unwashed four weeks		41	27 5	14.5	10	92
Washed eight weeks		41.5	28	15	10	94.5
Unwashed eight weeks		38	27	14 5	10	89.5

There were a number of experiments made each month in washing curd at a temperature of from 94 to 105 degrees. There was practically no difference in the quality of the cheese, but there was a slight difference in the yield in favor of washing at from 94 to 98 degrees, as washing at the higher temperatures caused a greater loss of fat.

During the summer I visited the East Zorra and Blandford factory, and learned from Mr. E. Johnson that he had experienced very good results by washing his curds immediatedly after dipping with water at from 93 to 100 degrees, and again after milling, and by making several experiments, I am able to corroborate his statements.

If the curd was cooked firmly in the whey there was apparently no advantage in washing twice, but if it was a little soft when dipped, the washing assisted in firming it and expelling the whey, and gave it a smooth, velvety feeling, which it otherwise would not have had. The acid developed between dipping and milling as quickly in the washed as in the unwashed curds. In each case the washed curds were of better flavor and the cheese stood the heat of the curing room better than the unwashed ones.

ROUGH VS CAREFUL HANDLING OF CURDS. Six experiments were made by putting 2,000 lbs. of milk in each vat, one being handled roughly from time of cutting to milling, and the other handled as carefully as possible, to note the difference in the yield and quality of the cheese. There was a difference of 2 lbs. of cheese per 1000 lbs. of milk in favor of handling the curd carefully. The flavor of the cheese was practically the same, but the curds handled carefully scored points in texture, and one point in color higher than the ones handled roughly.

The curds handled carefully not only made a better quality of cheese, but the extra yield of cheese would more than pay the difference in the SALARIES OF A GOOD MAKER AND A CARELESS ONE. A number of makers, after cutting the curd in the vat, stir it for a few minutes with their arms, and then use a small hay rake, while others prefer the long-tooth MacPherson rake. Four experiments were made to ascertain the difference from using the two rakes, and the results were in favor of the MacPherson rake, as there was a slightly larger yield of cheese and the curd was not broken up nearly so much.

The experiments which will probably be the most interesting, and I trust the most instructive to both makers and patrons, are those regarding the flavor of milk and cheese. As you well know, at a great many factories the whey is returned to the farmers in their cans, and this is believed to injuriously affect the flavor of the cheese, owing to the difficulty and carelessness on the part of some farmers who do not wash their cans properly, and as a result the sour whey injures the flavor of the milk.

Eight experiments were made by taking ordinary sour whey out of the tank (as it is usually returned to the farmers) and putting it into pasteurized, which was used as a starter. A very small quantity of starter was used, and no objectionable flavor could be detected in the curd. The score of the cheese was—

Time.	Flavor.	Texture.	Color.	Finish.	Total.
	45	30	15	10	100
Two weeks	42	29	15	10	96
Four weeks	38	28	14	10	90
Eight weeks	33	28	14	10	85

In making the experiments to find out to what extent the flavor of the cheese would be affected by allowing the milk to sit in unclean places, we pasteurized small quantities of milk in order to free it from germ life as given by the cow. Then we placed some of them near a pig pen, and others near a cow stable, where they could easily become contaminated with the foul germs in the atmosphere. The milk was allowed to remain in these places during the night (as it frequently is at the farmer's home) and a small quantity was used for a starter the next morning. The cheese were made in the ordinary way and no objectionable smell could be detected on the curd. Twelve experiments were made, and the average score taken.

Time.	Place.	Flavor.	Texture.	Color.	Finish.	Total.
		45	30	15	10	100
Two weeks	Pig Pen	42.5	29	14.5	10	96
Two "	Cow Stable	42	29	15	10	96
Four "	Pig Pen	36	28.5	14.5	10	89
Four "	Cow Stable	34	28.5	14.5	10	87
Eight "	Pig Pen	31	28	14.5	10	83.5
Eight "	Cow Stable	27	28	14.5	10	79.5

The results of our experiments regarding the flavor of the cheese as affected by the carelessness of some farmers in caring for their milk and allowing it to become contaminated with foul odors, is in accordance with what frequently happens at some cheese factories. No objectionable smell could be detected on the milk in the vat or on the curd which would lead the maker to believe that the quality of the cheese would be alright. At the end of two weeks the cheese were of fairly good quality, but it only required time and suitable conditions for the injurious germs to develop. When the cheese were ready to ship, the buyer would in most cases reject them, thus greatly injuring the reputation of the makers and factory, and causing serious loss. And then, when ready for the dealer's counter, they were a decided injury to the reputation of Canadian cheese, and very frequently the maker has to suffer the loss for which the farmers were responsible.

The results of these experiments should illustrate to farmers the desirability of disposing of their whey by other means than by carrying it home in their milk cans ; also of washing their cans cleaner and paying more attention to the care of their milk. Not only would they derive greater profit from their cows, but would make it much easier to produce a superior quality of cheese, for the producers of the raw material lay the foundation for the reputation of the finished product.

At the request of a cheese dealer we made a number of experiments by using starter when unnecessary, to learn the effect on the quality of the cheese. In each case the milk worked too fast. It was impossible to cook the curds properly. There was an excessive loss of fat, and the curds were much slower in maturing. The cheese was not of as good flavor. The grain was short and the texture quite mealy, and too pale in color.

The experiments regarding the best methods of handling milk with the flavor known as Billy-goat or goose flavor were not exhaustive enough for me to be able to report very definitely as we only received one sample, and although we endeavored to propagate it from day to day the flavor soon passed away.

The results of the work would indicate a decided improvement in the quality of the cheese by setting the milk sweeter than under ordinary conditions, getting the curds as firm as possible in the whey, and washing immediately after dipping and again after milling.

During the month of June and the early part of July the cheese in the curing-room moulded very badly. We were advised by one of the buyers to try the use of formalin, which effectively prevented the growth of mould during the remainder of the season. Where makers have not been successful in preventing the growth of mould by the use of formalin, I am inclined to believe it was on account of not using a sufficient quantity. We used one bottle which was supposed to last for two months in two weeks, which thoroughly disinfected the room. Afterwards two bottles lasted for the remainder of the season.

Fifteen cheese factories were supplied with starter during the season. It was sent out in glass sealers, and the makers in nearly every case reported satisfactory results from using it.

I wish to acknowledge the assistance given me by Mr. Goodhand, and to express my thanks for the very courteous manner in which he treated me.

Sub Surface Sewerage. I would now like to direct your attention to the sub-surface system of disposing of the sewage at factories, which was recommended to the Association by Dr. Bryce, of the Provincial Board of Health, and which has been in operation at the Experimental Station with satisfactory results. The question of disposing of the washing and sewage at factories is one of the most important in connection with the dairy industry, and deserves more attention than it receives. On the sanitation of the factory depends to a great extent the quality of the cheese and butter, and the reputation of the factory and maker, as well as the health of those living in the immediate vicinity. We are all well aware of the conditions existing at the average cheese factory, and how easy it is to locate many of them before coming very close to them. These conditions need not and should not exist.

At some factories the washings are allowed to run into the whey tanks. This lessens the feeding value of the whey, and injures the quality of the milk which has to be carried in the same can. Others drain it into a creek or river. But this oftentimes makes the water unfit for cattle to drink. At other factories it is allowed to run away in open ditches which become a breeding ground for foul smells and injurious germs. I can not understand how a factoryman can expect to exercise an influence for good over his

patrons, when the conditions surrounding his factory are not in accordance with his teaching, for "Example is better than precept."

The method of disposing of the sewerage by sub surface system is both effective and economical. It so often enriches the soil through which it is drained, and prevents any foul smell from developing. It enables the maker to keep the factory and surroundings in a good sanitary condition, which is absolutely essential if satisfactory results are to be obtained.

First, a box is made with a partition through the centre; forming two boxes, one of which is large enough to hold the washings from a factory for a single day. It may be situated near the factory, or at any distance away, as conditions permit. If the factory is elevated sufficiently the box may be sunk in the ground and covered with earth, but if it has to remain on top of the ground, it is preferable to build it of brick, and cover the top lightly to prevent the escape of noxious gases which form within it.

In laying the drain from the factory it is advisable to use sewer pipes, especially if it is situated near the well, or if there is any danger of injuring the water supply, otherwise ordinary field tile will do and will be somewhat cheaper. The drain must be provided with a trap to prevent gases or foul smells from returning to the factory. Then attach a vent pipe (2 in. gavanized) to the drain between the factory and the box and allow it to extend above the building. This will carry off the gases formed in the box or drain. The box is provided with a small goose neck pipe, which admits fresh air, and forms a draught for the ventilator. The box, you will notice, has a partition in the centre with a pipe through it near the top and extending down about the centre. When the first box becomes full the water is allowed to filter through into the second, and on account of its being taken from below the surface, nothing but the liquid matter flows through. The solid matter is all retained in the first box, and is quickly decomposed or oxidized by the different forms of bacteria at work in it. A filter bed is then provided by laying a sufficent number of 4-in. tile to hold the water contained in the second box from 10 to 12 inches beneath the surface of the ground, they being perfectly level and having no outlet. The sewage can be disposed of in a very small space of ground, if desired, by constructing one long drain and a number of branch drains about 10 feet apart leading from it. When the second box becomes full, the plug or valve if lifted and the water allowed to run out quickly, carrying any sediment there may be with it, and distributing evenly throughout the filter bed. It is necessary to have one or two ventilators in the filter bed to allow the air to escape while the water is running in. The outlet of the box is then closed tightly, and by the time the box is refilled, the water in the tile has been absorbed by the soil, and any solid matter left therein will be decomposed by the action of bacteria. It is necessary that the outlet of the box be closed tightly, otherwise the filter bed will not work satisfactorily.

The soil around some factories may be of such a nature that it would not readily absorb all the water used. It would then be necessary to under-drain the filter bed, which would carry off the surplus moisture, and give the filter bed greater capacity. Instead of putting the deep drains directly under the filter bed I would advise putting a long drain along each side, and then extending branch drains from those just half way between the branch drains of the filter bed. The water would then drain through 4 or 5 feet of ground to the under drain, which would render it free from solid matter, and it would then run off quite clear.

The system in operation at the Illustration and Experimental Station, consists of an ordinary tile drain leading from the factory to the box, having a trap on the end, and a vent pipe between the trap and the box. The box is 9 feet long, by 2 1 2 feet deep, by 3 feet 5 in. wide, and holding 500 gallons. It has a partition in the centre, making two boxes of 250 gallons capacity each. 250 gallons is supposed to be about the amount of water used at the average factory in a day. Then 500 4-in. tile, which hold 250 gallons, were laid perfectly level in the ground, and having no outlet. This plan worked well for about eight weeks, when there came a few days of very wet weather. As the soil was a very heavy clay the water began to come to the top. We then put in two under drains which carried off the surplus water. Afterwards there was no further trouble and the sewerage system worked satisfactorily. On opening the box at the close of the season, we found that the first box was nearly half full of solid matter. The second box was

fairly clean and there was a slight coating of greyish matter on the inside of the tile in the filter bed.

In closing, I may say that I am somewhat disappointed in not having been able to accomplish more work during the summer, but as a great deal of time was spent in the early part of the season, refitting the factory and putting in the sewerage system, and as I could only spend every alternate week at the Station, I was unable to do as much work as I hoped to But the work that was taken up I endeavored to perform very thoroughly, and I trust the results will be of some benefit to the makers and dairy men of Ontario. If we have been able to prove that by washing curds the maker is enabled to produce cheese of a better and more uniform quality that will keep for a greater length of time; if we have been able to demonstrate to the farmers through our experiments with bad flavored milk, the responsibility that rests upon them as producers of the raw material, and the necessity of greater care and cleanliness in caring for their milk, and keeping it where it will not become contaminated by foul germs; if we have been able to show them the unfairness of asking a maker to guarantee the quality of the cheese for which they are alone frequently responsible; if we have been able to demonstrate to makers the great responsibility they take upon themselves when they be come responsible for the quality of cheese over which they very often have slight control, and for which they sometimes have to suffer the loss of money and reputation; if the results of our work would suggest to makers the advisability of uniting for the purpose of protecting themselves, and the farmers who are furnishing good milk, then I claim, Mr. President, that the work in connection with the Experimental Station has not been in vain

Prof. DEAN: It took more milk to make a pound of cheese where the curds were washed?

Mr. SMITH: Yes, the washing of the curd had a tendency to hold it up to keep it together. There seemed to be a greater loss of fat in washing curds. At the end of the season I tested a number of the cheese with the Babcock test to see which cantained the greater amount of fat, and in nearly every case the cheese from the washed curds showed a higher per cent. of fat than any one of them. There was not very much difference.

Mr. DEAN: Did you take these curds out of the same vat?

Mr SMITH: During the earlier part of the season we took the curds out of the same vat; it remained together until after the milking, and then we stirred it, but of course in the experiments used to determine the amount of milk required we had to make them in two separate vats. The yield is the result of the milk made in two separate vats.

A MEMBER: How much water would you use?

Mr. SMITH: We used about twelve pails of water to each curd, that is a curd of from 5,000 to 6,000 thousand pounds of milk.

A MEMBER: At what temperature?

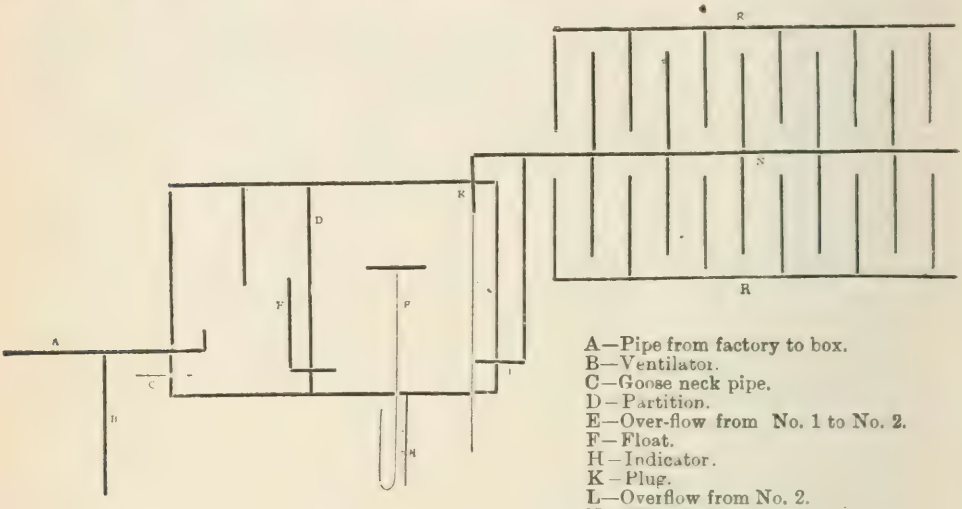
Mr. SMITH: All the way from 94 to 105° I may say as far as my judgment goes it is immaterial how much water you use as long as you use enough. I have seen some of the best makers using as much as from one to two barrels of water on a curd, but there was apparently no difference.

A MEMBER: At what temperature would you have your curd at milling?

Mr. SMITH: I would like to have it at about 94°.

The above is a plan of the box and filter bed. This letter A is a drain from the factory to the box, you will notice that it empties into the box at the top. At the end of this drain is a trap which stands full of water and prevents gas returning to the factory. The pipe marked B leading up is what we call a vent pipe to ventilate the box and the drain. The small pipe is supposed to represent a goose-neck, the fresh air is let in through this goose neck. If that were not there the gas formed would in a very short time burst the box open. You will notice that the box has a partition in the bottom which stops part of the solid matter filtering into the next box. Each of these parts of the box holds 250 gallons. We thought that would be the amount used in an average factory in a day. The little pipe marked E is a pipe conducting the water from the first box to the second box. You will notice the pipe goes into the partition near the top, but just a little below where it enters. The water has to get into this pipe from the centre of the box, and any greasy or solid matter on the top of the tank is prevented from getting into the second tank, and there is nothing but clear water reaches this second tank, all the

solid material being retained in the first tank. You will notice a float in the second tank and on top there is a post with a chain and a weight on it, this indicates how full the box is. It will tell you when the second box is full. Then you will notice a valve that holds the water in this second box. The pipe marked L is an over-flow from this tank in case the maker does not happen to notice when his tank is full, and it prevents the water from backing up into the factory.



A—Pipe from factory to box.
B—Ventilator.
C—Goose neck pipe.
D—Partition.
E—Over-flow from No. 1 to No. 2.
F—Float.
H—Indicator.
K—Plug.
L—Overflow from No. 2.
N—Filter bed.
R—Under Drain.

These lines marked M represent the filter bed. They are four-inch ordinary field tile which are connected with the box at the bottom and extend in a straight drain along to the end, and then there are branch drains connected with it. They are ten feet apart and about ten or twelve feet long. You can have them as long as you wish. This is immaterial. I might say that, in the first place, this system worked satisfactorily for about eight weeks ; then on account of so much wet weather we found there was too much water there and we put in two drains directly under this filter bed coming right up under the centre. On acccunt of the ground being so level and having so little fall we could not put these under drains as deep as we would wish to. Near the top end they were within eight inches of this filter bed ; consequently the water broke through that small quantity of soil at different times, and we had a little difficulty until we fixed it. After that we had no more trouble. Now I may say this system, which is recommended by Dr. Bryce, has worked satisfactorily.

When this second box becomes full we open this valve. It has a plug similar to those used in the weigh cans of the factories. That plug must fit perfectly tight, otherwise the water from this second tank will be running out gradually into the drain and if there happens to be any sediment in this second tank there is not sufficient force of water to carry this solid matter and distribute it, and it falls between the filter bed ; consequently your drain is soon clogged up. So when this box becomes full the water runs out with considerable force, and any sediment that might be there is distributed thoughout the tile. The tile laid here must be sufficient to hold the quantity of water in this box Two ordinary four inch tiles will hold one gallon of water. This second box holds 250 gallons therefore we laid five hundred four-inch tile. These tiles are perfectly level and about ten or twelve inches under the ground. They have no outlet whatever. Then when you lift this plug the water runs out and the drain is filled up again, and by the time this box is refilled the water in this filter bed has been absorbed by the soil, or has been carried down through the soil to the drain beneath, and it runs off quite clear.

This water empties into a drain down at the end. It ran off there a whole season through, and there was no objectionable smell at the end of the drain where the water emptied out into the open drain ; it ran out quite clear. The under drains are marked B ; they are connected with an open drain at the end. They extend down along each

side of the filter bed, and the branch drains come with them just half way between, the branch drains in the filter bed, of course, being lower than other drains. The water through these drains is filtered through the soil into this under drain, and is carried away.

This filter bed was in the garden just behind the factory. There were vegetables growing there the same as if there was no filter bed, and there was an enormous, rapid growth, and the vegetables were exceptionally large.

Mr. STEINHOFF: I think this report is a very interesting one, and gives us a great amount of valuable information. Mr. Smith has made his report very clear. The washing of curds is a thing that I think is of much importance, and you will pardon me if I take credit for being the first cheese-maker that washed curds in the west, and the first to advocate it. I remember advocating it at the convention we held in Guelph. I have frequently noticed the beneficial effects of washing curds, last year more particularly. During the last few years at a number of our leading northern factories a number of makers have washed the curds. They started out through the advice of Mr. Smith, and I have noticed a superior quality of cheese. I have said if Mr. Smith did nothing else, he did a great deal of good in this particular case. I found that the time of milling was an important point in the milling of curd; that is, I always found it necessary to cut them early, so that there would be no loss of time. Another point I think should reach every dairy farmer, and that is the experiment made in getting that flavor from the hog pen and from the cow stable, and the injurious effect it had upon the cheese as they developed. I think there are a few things in which we are not making the progress we should, and one is the improvement of the milk as it comes from the farm. I was going to make a suggestion, and that is, if the suggestions made in Mr. Smith's paper could be put into a circular and sent to every dairy farmer, separate and distinct, so that it would illustrate to them the effect of bad flavor of that kind, it would be the means of doing a great deal of good. The sewerage system is something I am not acquainted with, but I am sure that it is of great value, and the different points brought out by this report should be very far reaching, and should be very beneficial to us. This is the first year we have had an experimental station of that kind. No doubt in the future it can be perfected to a greater extent than it is at the present time. I am sure we can drink in a great deal from this report. I would like to ask Mr. Smith where he got that milk? Was it absolutely pure milk before he put it where it was exposed to these obnoxious smells?

Mr. SMITH: Yes. As regards cutting curds, do I understand Mr. Steinhoff to ask whether we cut the curds earlier when we washed them?

Mr. STEINHOFF: Than you would otherwise.

Mr. SMITH: I am sorry to say that is a point I did not experiment on. We milled the curds when we thought they had sufficient acid, and washed them immediately after.

As regards the milk, we just simply took the milk from one farmer who was sending to the factory and pasteurized it, and cooled it down to about 90 or 95. We endeavored to get as near same conditions as would have been had the milk been given by the cow, and placed in these conditions.

Mr. STEINHOFF: That is the point I wanted to get at.

Prof. DEAN: In these experiments, where you divided the curd and washed them, did you notice any different yield of cheese?

Mr. SMITH: I did not experiment on that. In that case, you would have to weigh both lots of curd, and then weigh the cheese from the whole quantity. I divided the milk into two separate vats to determine the difference in the two yields of cheese.

Mr. MACFARLAND: Would it be advisable for cheese-makers or factories to furnish a tank or vat for holding the whey, similar to that for holding the milk, only of a cheaper quality, which could be washed out each day, and the whey returned to the farmer in that manner?

Mr. SMITH: That is simply illustrating what Mr. Morrison and the other instructors have been advocating for some time, that the whey vat should be washed out each day. The sour whey would soon destroy the tin, and it would soon rust, and would be useless. It would be much better to take the ordinary wooden tank.

Mr. MACFARLAND: You will never keep a wooden tank clean.

Mr. DERBYSHIRE: It would be all right if you painted the tank on the inside.

Mr. DUNN: Will this filter bed become foul in time?

Mr. SMITH: Dr. Bryce says no. The solid matter which accumulates in this filter bed is decomposed by the action of soil bacteria, and this tile does not fill up. We have only used this one season, and there is no appearance of them filling up at present.

Mr. DUNN: Will the soil become so contaminated that it will not filter the water?

Mr. SMITH: No, I think not; because the soil is dry; any dry substance will absorb the moisture. As long as the solid matter which runs out with this water is decomposed the ground is practically the same, but I suppose it becomes enriched, and this extra nutrition is utilized by the plant growth to a certain extent.

Mr. DERBYSHIRE: If we had the extra plant growth it would pay to remove it.

Mr. SMITH: It would not be necessary to remove it, because I think the plant growth would utilize it.

A MEMBER: Do you expect that the coating of an eighth of an inch will be gone by another season?

Mr. SMITH: It may be. I think that it won't grow to any extent. I shall be glad to experiment on that further.

A MEMBER: Is the vegetation grown on that ground fit for use?

Mr SMITH: Is the vegetation grown from the barnyard manure fit for use? I believe the washing from a cheese factory is just as good a fertilizer as any other fertilizers.

Prof. DEAN: Will this operate in winter time?

Mr. SMITH: Dr. Bryce has it in operation in winter time, and says the snow is a good protection for the drain; the water being warm, it runs off before it freezes. I understand Dr. Bryce has this in operation in his own dwelling place, and that this filter bed is under the lawn in front of his dwelling. I also understand from him that some of these large sanitariums in Western Ontario are provided with the sewerage system similar to this.

A MEMBER: That would be a good system for farm dwellings.

Mr. SMITH: Dr. Bryce recommended it where they have no sewerage system.

A MEMBER: Where would you put a ventilator?

Mr. SMITH: Let it run up the side of the house. There is no objectionable smell coming from the ventilator from the filter bed.

A MEMBER: How far should the filter bed be placed from the building?

Mr. SMITH: That would depend to some extent on where your water supply is, but it should be far enough from the building so that there would be no danger of contaminating the water supply.

A MEMBER: What would be the cost of that?

Mr. SMITH: It only required two days to put it in. This box cost fourteen dollars, and the tile cost nine dollars.

A MEMBER: What are those boxes made of?

Mr. SMITH: Ordinary inch and a half or two inch pine. I coated the box over inside with tar pitch, to prevent it from rotting.

A MEMBER: How deep in the ground should the filter bed be?

Mr. SMITH: From ten to twelve inches.

A MEMBER: Any danger from frost in winter?

Mr. SMITH: That is what I endeavored to explain. When the snow is on the ground the water is filtered downward before it would freeze. Or course, the one we have has not been in operation during the winter time. At the end of the season I opened the box and found it was half filled, but it had been in operation for a whole season.

A MEMBER: Would there not be a bad stench coming from that?

Mr. SMITH: There cannot be a bad smell, because it is carried up this vent pipe over the top of the building.

Prof. DEAN: What are you going to do with that material for the next season?

Mr. SMITH: We simply clean it out. I think the reason there was so much solid material in that first box was that we run out so much hot water.

A MEMBER: What would be the cost of labor for laying that?

Mr. SMITH: I think about nine or ten dollars.

A MEMBER: Digging and laying the tile and covering up?

Mr. SMITH: Yes. The cost of labor is governed by what you can get it for. In that county labor was scarce, and we had to pay high prices. That is why the laying of the filter bed cost more money than it otherwise would have done.

A MEMBER: Are these two boxes under ground?

Mr. SMITH: Yes. The factory is so situated there that we can put these boxes partly under ground, and then I covered the remainder over.

A MEMBER: Would you advise washing the curd with sulphur water if you did not have anything better?

Mr. SMITH: Yes, I think I would; but I would like to have the water in a barrel or tank some little time before you required to use it; then you will find that the flavor of the water will pass off to a very great extent.

THE RUNNING OF CREAM SEPARATORS, AND THE BEST METHODS OF PREPARING MILK FOR SEPARATION.

BY MR. F. DEAN, ST. MARYS.

Of all the numerous duties of a maker, none are as trying and responsible as when he is to show his knowledge and ability of taking in and rejecting milk, tempering it to have the best results, and looking after the speed, etc., of the separator.

Milk, fresh and warm from the cow, at animal heat (98 degrees) is in its best condition for separation, and deteriorates from that time, so that the sooner it is made into butter the less loss we will have; but as we cannot always have it in this condition at our creameries, we must substitute some methods for having it as near natural as possible, which should begin with the patron aerating and cooling to 60 or 65 degrees immediately after milking, holding it at that temperature in a pure atmosphere until delivered at the creamery; and if the warm fresh milk which naturally has a cowy odor, has not been added to the cooled and aerated milk, until it has been treated likewise, there will be no danger of its rejection, and it will facilitate matters for separating. Milk that has been frozen, or near freezing point, is more objectionable than sour milk, as separation is never thorough, and always gives a bitter flavor to the butter. When the milk has been carefully weighed, sampled, and strained through a very fine wire or four-ply cotton strainer into the receiving vat, the heating for separation begins, for the purpose of expanding the fat globules and causes them the more readily to separate from the milk serum; it also increases the capacity of the separator. Milk heated by the direct application of steam is very unsatisfactory, as it gives the milk a distinct boiler flavor, irregular temperatures, and a higher loss of fat in the skim-milk. The flat-bottomed receiving vat gives better satisfaction than the round, on account of more milk surface exposed, and therefore easier heated. A space of two or three inches should be placed between it and the jacket for water and steam, having two pipes two-thirds the length of the vat, perforated with small holes every three or four inches for the escape of steam, and at the entrance end, connections for either live or exhaust steam, with noiseless heaters attached, made with a common T, having a tapered reducer screwed into it at one end, so that it covers two-thirds of the hole on top, and at the other end a piece of iron screwed in with a small opening, fastening this to the pipes with buckles. The water in the receiving vat should be heated 40 or 50 degrees higher than the temperature required for the milk, as the cold milk entering the vat will keep the remainder of the milk that much lower; occasionally stirring the milk will help to even the temperature and prevent the milk from being scorched or burned. A temperature of from 75 to 80 degrees should be retained for pumping into the tempering pan, a higher temperature not being economical, and will also burn on the sides of the vat. The pump should be placed as far as possible from the intake, so that the warmest milk will be delivered into the farthest corner of the tempering pan. The pan should have a capacity of no less than 200 pounds, allowing the milk to circulate and heat four or five minutes before entering the separator. The tempering pan should be made of the best of galvanized iron, having its parts well soldered together, with three or four V shaped channels for the milk to pass back and forth, and at three or four inches from the outlet, a slide placed from the bottom to within one inch of the top, so that the hottest milk will flow over it into the connections for the separator, instead of the milk at the bottom which is colder, and thus keep a more uniform temper-

ature. The jacket of this should be fixed similar to the receiving vat, allowing connections for the live steam only, this giving better satisfaction than the many kinds of closed iron heaters used, which are hard to keep at a uniform temperature, and harder to keep clean. To keep the temperature of milk uniform in a machine—and no machine will do its best work without this and the uniform speed—have your tempering pan always full, and not over 1,000 pounds in the receiving vat, as the high temperature of the old milk will hasten the development of lactic acid, causing the albumen to collect on the inside wall of the separator bowl, thus clogging up the skim-milk outlets, while if less than 300 or 400 pounds are in the vat it is hard to keep it heated when the cold milk is entering, so the operator must be on the alert looking after the regulating of the steam valves, having a thermometer fastened in the hopper of separator with a piece of bent wire where it can be easily seen.

The right temperature for ventilating depends upon various conditions, as to the make of separator, season of year, rate of inflow, centrifugal force generated, age and physical condition of milk, but a temperature of 90 to 100 degrees in winter should leave but little loss of fat in the skim milk, and if more than .05 per cent. is found we should look for our trouble in the machine, which should in the first place be set on a solid foundation, as no machine requiring such high speed can do good work or run true without trembling, when affected by an unsubstantial foundation. Then see that you get a machine which has had a good and reliable record, a close skimmer, one requiring few repairs and an economic user of power to run it. Examine all parts to see that they are in their place, and the bearings free from grit and dirt; the frame and bowl perfectly level, belts true and tight, taking from fifteen to twenty minutes to get up full speed, as if speed is acquired too quickly it cuts and burns the belts, making them short-lived, and very frequently throws the machine out of balance. A tightener should not be used only when absolutely necessary, as the tension is heavier than most belts can stand and will soon wear them out. If a turbine machine is used, that is one driven by steam direct, blow the steam feed-pipe out well with hot water, then live steam, to loosen and clean out all cinders that may be in the pipe, before connecting it to the separator, while extra precaution must be observed in order to keep the steam pressure uniform on the boiler, as the lowering and raising of the pressure affects it a great deal more than when it has been transmitted by belts; therefore is harder on the wear and tear of the machine and does not do so thorough skimming. In the process of separation the milk flows into the bowl through a tube in the centre, and is thrown by the centrifugal force to the outer edge of the bowl, and gradually fills toward the centre, so that when starting the milk into the hopper it should be filled as quickly as possible, and then lessened until the hopper is about one-half full, giving the machine a better chance to do thorough work than when crowding it full. The longer milk is subjected to the centrifugal force and the slower the milk flows in, to a certain extent, the more complete will be the separation, while the greater the inflow the more and thinner the cream, which can be increased to that extent when the cream and milk will be together forced promiscuously through both outlets; and if we decrease the flow so that there is not enough pressure to combine with the centrifugal force to separate the milk, the whole milk will be discharged through the skim-milk outlets the same as it enters. Most machines have a regulator for increasing or decreasing the quantity of cream, called a cream screw, which affects the amount of cream by placing the cream outlet nearer or farther from the centre of the bowl, the nearer the thicker the cream, and farther the thinner and larger bulk; but a cream of 30 per cent. to 35 per cent. in winter has better advantages for ripening, while a cream of 35 to 45 per cent. of butter fat in summer gives less bulk to cool, and is not so liable to take on bad flavors or develop acid too quickly, and the starter has better control of it than a thin cream. The centrifugal force acts more strongly upon the parts of the milk that have the greatest specific gravity or milk serum, and is forced to the centre and finds an opening near the top. A third and very objectionable portion of the milk, which is heavier than either the cream or milk serum is found on the wall of the separator bowl after separation, generally known as slime; this substance is composed of albuminous matter, dirt from dirty and careless patrons, and sometimes refuse from the stables. If the milk taken in contains much of this it will soon clog the skim-milk outlets, and the milk will force its way to the cream outlet, giving a very thin cream, so that when this is noticed stop the machine and clean it at once.

When separation is completed rinse out the vats with as small amount of water as possible, and enough warm water or skim-milk for the separator to force all cream from the spout, shut off lubricators and use no means to slacken the speed of the separator, other than sliding the drive belt from tight to loose pulley, as other ways of slackening speed tend to wear out both belts and bearings. When the covers have been removed, syphon the water out of the bowl, and take the separator apart, washing thoroughly every piece in warm water, then scald and steam to prevent rusting, leaving them to aerate two or three hours in the sun if possible before putting together again. The pipes and all connections should be washed and steamed every time used to prevent scales of milk adhering to them, which would soon develop a nest of very bad bacteria. Cleanliness, feed, speed and temperature should be rigidly attended to during the process of separation to attain the best results, also the operator should study the directions for running the different machines, and become thoroughly familiar with every part, taking such an interest in his work that will be sure to bring success. (Applause).

Mr. BELL: Do we understand from Mr. Dean that he recommends making a tempering pan out of galvanized iron instead of tin?

Mr. DEAN: We have a number of our vats made of tin, and find difficulty with the rust. It keeps us busy soldering them up, and steam has such a power on it, the tin is not considered good enough to stand the pressure.

Mr. DERBYSHIRE: Do you not put a wooden jacket on?

Mr. DEAN: No; all galvanized iron.

Mr. BELL: We will soon have to get a new one, and I fancied that tin would be the best. You say the galvanized iron is just as easy to clean?

Mr. DEAN: At our station we have a tin one, but it is sent in once a week to be soldered up.

Mr. DERBYSHIRE: You put a wooden jacket on and you will find your tin will last.

Mr. DEAN: We have tried the wooden jacket and find it is not a good plan.

Mr. DERBYSHIRE: We have a wooden jacket and we find it is a good thing.

Mr. DEAN: I would like to ask Mr. Laing if he has the wooden jacket he had some years ago.

Mr. LAING: No; it is thrown out.

Mr. DEAN: I believe galvanized iron is the best.

Mr. BELL: How many channels would you recommend in the tempering pan?

Mr. DEAN: It depends on the length.

Mr. RUDDICK: I think it is much more economical to use tin copper for those pans. We are altogether too economical in this country on these lines, and if we would make our heaters, where one surface is exposed to steam, tin-copper, it would be much better.

Mr. DEAN: If we had tin-copper the same as we have in our pasteurizers it would be all right. I would prefer the galvanized iron. Our tempering pans hold from 200 to 300 lbs. of milk.

Mr. RUDDICK: I do not think it would cost any more in the end, because they will last almost indefinitely, and if the copper is hammered before it is made the tinning will last for a long time and is very much easier to clean.

Mr. STONEHOUSE: Have you ever used any other kind of tempering pan, one without a channel?

Mr. DEAN: Yes, but I find them very hard to clean.

Mr. RUDDICK: All the steam connections and water connections for any heater or anything of that kind, even for the cheese vats or milk receiving vats, should be made of galvanized iron pipe. If we used galvanized iron pipe there would not be the same scale or rust coming off the inside of the pipe. The small scales very often start the rust in the bottom of the vat. If galvanized iron is used, a cheese vat will last just about three times as long as where plain iron is used. The pipe, of course, costs about one-third more, but it is a good investment.

Mr. STONEHOUSE: It has been recommended to use a round bottom receiving vat.

Mr. DEAN: I think you would use about half the amount of steam for a rounded bottom heating vat that you would for a flat bottomed vat.

A MEMBER: Do you advocate heating the milk 95 degrees in summer as well as winter?

Mr. DEAN: No; I was referring to winter. In the summer time, when milk is coming in every day, I would not heat it over 80 degrees.

A MEMBER: Is it any advantage to heat it at all in the summer?

Mr. DEAN: If you have a machine that will skim it clean, no. We do not heat the milk in the summer time, because with our machine we separate clean. There are very few machines that will separate milk that is as cold as it is when it comes in if it has been cooled down to 65 or 70 degrees.

A MEMBER: I know there are a great many creameries in the Province of Quebec where they do not heat their cream in the summer at all, but I am told that is not followed in Ontario.

Mr. DEAN: We do not heat our cream at all in the summer time. Of course, take a hollow bowl machine, and I do not think they will separate unless the milk is heated up.

A MEMBER: I notice that you recommend twenty minutes for raising speed for the separator. Don't you think that is too long?

Mr. DEAN: Rather than reduce the time, I would increase it. To be on the safe side, I would always say 15 or 20 minutes. If you start a machine up too quick you cause it to tremble, and when once a machine starts to tremble, it is hard to get it going right again. If a machine is started gradually the oil in the bearings does not get warm, and you can run right through without heating or trembling.

A MEMBER: What temperature do you ripen at?

Mr. DEAN: We ripen at 75 degrees in winter time. If you cannot cool it down quickly afterwards, it is better to ripen at a low temperature.

A MEMBER: When do you add your starter?

Mr. DEAN: As soon as we get our cream down to 75 degrees we add it. We pasteurize all our cream.

A MEMBER: Do you think a higher percentage of butter fat will give you a better grain?

Mr. DEAN: Yes, I think the higher percentage of butter fat you have in cream, the better grain you have in the butter. Of course, it depends on the treatment afterwards, but the thinner the cream, the smaller amount, and the thicker the cream, the larger amount we put in the churn.

Mr. GOODRICH: You can churn at a lower temperature with rich cream.

Mr. DEAN: Yes, but sometimes when we have a very rich cream it is quite a job to get it cooled down if you have not artificial cooling.

A MEMBER: What percentage of starter do you find necessary in winter time?

Mr. DEAN: We use about 10 per cent.

A MEMBER: Do you make your starter from whole milk or skim milk?

Mr. DEAN: Pasteurized skim milk the year round.

A MEMBER: What temperature do you churn at?

Mr. DEAN: In winter time 52 to 54 degrees. Our cream is about 35 per cent. With from 35 to 40 per cent. cream you can churn at 52 in three-quarters of an hour.

A MEMBER: At what temperature do you use your washing water?

Mr. DEAN: About 58 degrees in winter time.

A MEMBER: Is it a fact that water warmer than the churn temperature affects your yield, that is, increases your yield?

Mr. DEAN: Yes, it does. By churning at 52 degrees, and washing your butter at 52 degrees, you will have a smaller yield than you would washing at 56 or 58 degrees.

A MEMBER: Warm water will not affect the yield of the butter?

Mr. DEAN: No, I do not think so. I never found it that way.

Mr. GOODRICH: Mr. Secretary Wilson was doing the best he could for a market for United States butter in England. He wanted to send some good butter, and he sent to the makers in the different parts of the country to have them make some of the best butter they could, as he was going to send it to Manchester and London to see what was the matter with our butter. One of my sons made some butter, and he made it as dry as he could. He made it dry by working it twice, and it was sent over to England, and that was the only butter that I heard of that they did not say had too much water in it. That butter had good keeping qualities. One box of that butter was sent back to the National Convention at Soo Falls, and it was scored there and scored up to nearly 90. I say it is not policy to sell all the water we can for butter, just because we are

going to get a little more money out of it. At present our reputation, and your reputation, depends on the butter that you make, and I say it does not pay to put more water in for the purpose of getting big dividends. I cannot sit still; I have got to get up and protest against it that you must not do it. I am going to say it in the United States and in Canada, and I am going to say it wherever I go just as long as I live. (Applause.)

CREAMERY BUTTER-MAKING.

By J. C. Bell, Winchelsea.

We are going to discuss the making of creamery butter during the summer months, and I am going to start a little before the cream is in the vat and put the starter in first. I use a pure skim-milk starter, about ten per cent. Then I have the cream run into the starter at a temperature of from 65 to 70 degrees, keeping them well stirred till the cream is all in. I leave it with very little stirring till it begins to show acid. Then I cool it as quickly as possible to 52 degrees, and keep it well iced till churning time when it will be 48 degrees or lower. This is a very desirable temperature to churn at, and one that should be strictly adhered to, as it will give a very exhaustive churning and a firm, fine grained butter. When the butter breaks I put in a strong brine and also add plenty of water, which causes a slower and cleaner gathering of the granules. Then I allow the churn to revolve till the granules have a coarser appearance than wheat grains. Now the butter-milk should be drawn off quickly, not allowing the butter to get warmed at all. In washing the butter I try to have the water at the same temperature as the cream. I use plenty of water and wash once only, letting the churn run fast and for not more than half a minute. Then I let the water drain off well before starting to work the butter. This is where the 48 degrees of temperature is particularly noticeable. On the warmest days, the butter will be almost as firm as we have it in the winter, and will stand the amount of working it requires without getting soft and oily. I prefer to work it till it becomes pliable, and to where it draws slightly rather than breaks. This, I think, gives as good a grain, and a tougher texture. The slightly coarser churning also helps to this texture. In salting I think about $\frac{5}{8}$ of an ounce to the pound of butter is as near the correct quantity as we can get, without being advised by purchasers. The salt should be about the same temperature as the butter. The packing of the butter is the last, but not the least important point. Too much care cannot be taken in packing it properly, and in having it present a neat and attractive appearance. There should be no holes or crevices left for brine to gather in. If there are any there will also be a discoloration of the butter where they exist. This is another point in favor of the coarser churning. There is less moisture left in the butter to gather in these places, and also less butter is required for shrinkage in the package. The packing should be done in such a manner that, were the butter turned out it would appear as smooth on the sides, as the package. Great care should be taken to have the paper lining smooth and straight, thereby allowing no creases or wrinkles in butter. None but heavy paper should be used. The heavier the paper the less trouble there will be in this respect. In finishing the top of the butter a wood scrape gives the best result. It makes a nice level finish that is pleasant to the eye. When this is done, should the sides of the package be above the surface of the butter, it is better to plane them down and allow the cover to fit tightly on the butter. It will take a few minutes longer, but they are minutes spent very profitably. Then have all packages spotless, and do not allow them to leave the creamery unsacked.

J. E. Stonehouse: There are a few points I would like to have some discussion on. The first is putting in the starter. Of course, if we know just about the quantity of milk that is coming in, we will be able to put in the right proportion of starter. I usually put in the starter before the cream commences to go in, but where the milk is pasteurized we cannot do that unless it is cooled down. I would like to ask Mr. Bell if he pasteurizes the cream?

Mr. Bell: We do not pasteurize the cream at all.

Mr. Stonehouse: If we put the starter in at a temperature of 120 degrees or over we kill the starter. I have tried putting it in at 120 degrees and have found that the starter

was killed. Where the cream is pasteurized we have to first cool it down to the required temperature and then put in the starter. Mr. Bell says he cools down directly to 52 degrees.

Mr. BELL: As soon as the cream starts to show acid.

Mr. STONEHOUSE: As soon as there is sufficient acid to start the cream to thicken then I want to get it cooled down, because if I find I have allowed the cream to thicken before I commence to cool down I have trouble in cooling it down. It requires double the quantity of ice. With regard to rich cream or poor cream not cooling down, I have not found very much difference. I think putting in the brine after the churning is done is a good practice; it tends to form up granules of butter, and also tends to take the buttermilk from the grains of the butter and give it a cleaner and brighter body. If we churn at a higher temperature our butter usually looks milky. We cannot get granules as hard and firm as we should by churning at a low temperature. Mr. Bell says he just washes once. Do you follow that practice in export butter?

Mr. BELL: Yes.

Mr. STONEHOUSE: I have found it better to wash twice if you can get the water. For the local market it is all right to wash once. It gives the butter a higher flavor if you only wash once. There is danger of washing away the flavor of butter. We must be careful and not leave the water on the butter too long. If our butter is soft sometimes we leave it on to harden up the butter, but in doing so we are apt to lose the flavor. I suppose $\frac{5}{8}$ ounce of salt is all right for export butter. I have had requests to salt as high as $\frac{3}{4}$. I think $\frac{5}{8}$ is about right. I would ask Mr. Bell what kind of a packer he uses.

Mr. BELL: Square one.

Mr. STONEHOUSE: I have found a square packer will do the best work. The round packer is a very poor way of doing it. I like to take a square packer, a large one, and pound the butter in, and take the thin one and go all around the edges. In that way I have been able to make a much more presentable package of butter than I can with a square packer alone. Do you brine your paper?

Mr. BELL: Yes, 24 hours ahead.

Mr. STONEHOUSE: I think that is a good practice. I have never been troubled with mould in my export butter except once, and that was not the fault of the brine paper. Where the paper has been soaked well in brine from 12 to 24 hours, I think we will have very little complaint about mouldy butter, but I would never think of using these preparations without brining the paper as well.

Mr. WENGER: Have you ever used any of these chemical preparations?

Mr. STONEHOUSE: I used a preparation last summer sent out by Prof. Robertson to the Northwest, and found it very good; but I would not like to use the preparation without using the brine too. I think when we used paper without brining it the butter draws the color from the paper, and where the butter touches the paper on the outside we have a paler looking butter.

Mr. WENGER: How long is your butter packed before it is opened up in the market?

Mr. DEAN: Three or four weeks. Never longer.

Mr. STONEHOUSE: Do I understand you to say, Mr. Bell, that you leave the butter flush with the top of the boxes?

Mr. BELL: Nearly so.

Mr. STONEHOUSE: In the Northwest we had instructions to fill the boxes 58 pounds and something over for shrinkage. That is all right for a certain market, but if we send to the British market we do not get allowed for any surplus butter, and I think from a pound to a pound and a half is sufficient. If we allow a pound or a pound and a half over and then have 57 pounds in the boxes, that would make 58 pounds and a half, and we are losing a pound on every box, so I think it is better to cut the boxes down even if we have an inch of space on the top of the boxes. I like to have a good top of paper on top. I think it is better to have two or three thicknesses of paper and then put on salt. I find that method is giving good satisfaction.

Mr. WENGER: What market do you make for?

Mr. STONEHOUSE: Last summer the butter was made for the British Columbia market, and they allowed for all the butter in the boxes. When the St. Mary's Creamery was started we allowed a pound over, and we had a bill come back for 200 pounds of butter,

so after that we put in a pound and a half or a pound and a quarter. Mr. Dean says he only puts in three-quarters of a pound of butter.

Mr. Dean: Pasteurizing makes that difference. Pasteurized butter will not shrink as unpasteurized.

Mr. Stonehouse: That must be because it is a drier butter. I think we get a drier butter from pasteurizing.

A Member: How long do you let the washing water remain on the butter?

Mr. Bell: Just get it off as quickly as possible.

A Member: Do you salt the butter in the churn?

Mr. Bell: Salt in the worker altogether. I have never used gathered cream; always separator cream.

Mr. Wenger: I come from a part of the country where we cannot afford to buy a separator, so we have to use the old-fashioned pan and deep setting pan, and we get our butter to the market and get as good a price as you people get. We generally get there with both feet, and sometimes with four feet.

Mr. Goodrich: I want to say something about the temperature of churning. It is impossible for anybody to come here and say just the right temperature to churn at. He can say what will be the best temperature in average cases, but the best churning is done at as low a temperature as you can churn at and have it come in a reasonable time. I think you will all admit that it depends a great deal upon the breed of cows, on what the cows are fed, and the period of lactation. At the World's Fair, every single pound of butter that was made there sold quickly at 35c a pound, and they were crazy to get it. It was the best that could possibly be made. The churning was done with each of these herds at just as low a temperature as they could churn at, and I have the records in my house of every churning there, the exact test and test of the butter milk, and the analysis of the butter. Once for several days the Guernsey butter was churned at 43 degrees; that was as low as they could go with it. At the same time the Jersey butter had to be up to 53 degrees, and the Short-Horn butter at 51 degrees. Whether it was owing to the breed of the cows entirely, or whether it was owing to some of the feed, I do not know. I have churned the milk of each cow separately in testing my herd, and I find that the temperature of the different cows raised the churning all the way from 50 to 70 degrees. I had one cow in my herd that I would defy anybody to make butter from at anything less than 70 degrees. So you see the man that come to you and says 52 or 53 or 55 degrees is the right temperature may be right on averages, but you have to learn by experimenting, and then churn at as low a temperature as you can. I say this so that there will not be anybody go away saying "some of these experts have said a certain temperature is the right temperature." You want to churn at as low a temperature as you can. I was very glad to hear one of these gentlemen say he did not want the washing water to stay on the butter any great length of time. We have heard of instructions to make butter where they tell you to wash it until it is perfectly clear. Now, I tell you that takes out some of the fine flavor. Some men say it is the butter-milk you are tasting, but I tell you the public wants a little of that flavor in it, although they are getting to want a milder flavor than they used to ask for; but where you have butter scored by an expert, he wants to have a good pronounced flavor, or he will not score it up near 100. Oleo looks like butter, it tastes like butter, only it don't taste but a little. Now you don't want to go making butter that comes as near oleo as you can, or you will be accused of trying to get butter down somebody's throat when they want oleo. When you make butter, make butter, and make it like butter. It has got to have a little of that butter flavor, and you must not wash it out too much.

Another man said he salted his butter on the worker. That looks old fashioned, but there are some old things better than some new things. Not but that it can be salted in the churn and done perfectly right. It can be done in the combined churn and worker and save labor. I have not heard a word said about motttled butter; but I know that in the United States, since the advent of the combined churn and butter worker, there is a great deal more mottled butter. The trouble is, it is all shut up and they do not know how much it is worked. After it has gone around ten times, they say that is enough. Mottled butter is made by the uneven distribution of salt. It takes time for the salt to change the butter to the deeper hue. They think the butter is worked all right, and they pack it in a tub, but when they come to draw it out with a trier they find it is mottled. Then

the next time the buttermaker will run the worker too long till he has totally destroyed the grain. Now, if he salts it on the worker he is on safer ground because he can see just what he is to do. The best butter that is made for the Old Country is made by salting it, and working it just to get the salt mixed in, and then leaving it six or eight hours, and then working it again. That makes drier butter, and that is the butter that is best in the end. When my son was making the butter which was sent to England, he worked it once, then waited six or seven hours and worked it again, and the butter analyzed 67 per cent. of butter fat, 10½ per cent of water, and 2½ per cent. of salt, which is less than ½ ounce to the pound. Three per cent. is about a half ounce to the pound.

Mr. STONEHOUSE: What we understand as salting butter in the churn is not in the combined churn. We use the ordinary churn without any worker. I have salted butter in the churn for several seasons, and have never yet been troubled with mottled butter. My practice is to salt in the churn, and then let it stand an hour. After salting I first revolve a few times, then let it stand 10 or 15 minutes and revolve it again, and in that way the salt is thoroughly incorporated into the butter, much more so than you can on the worker. If we salt on the worker our granules are gone at once, as soon as the worker makes one revolution If our butter is firm in the churn we can revolve it several times before the butter loses the granule form. If you leave it for an hour the salt becomes dissolved, and becomes well distributed throughout the butter. Then if we take it out and work it on an ordinary worker, the salt being dissolved it will become thoroughly incorporated with the butter, and we will have very little trouble with mottled butter. But if our butter is very hard when it comes out on the worker we will probably have a little trouble, because the salt does not dissolve as rapidly if the butter is hard and cold. I think the danger of mottled butter would be in the winter time when the butter is hard. Do not run away with the idea that Mr. Goodrich is admitting the old fashioned idea of salting in the churn. I maintain we can get butter that is not mottled by salting in that way.

A MEMBER: What effect will washing at a different temperature to the cream have in making mottled butter?

Mr. STONEHOUSE: If we wash with too cold water we get the granules of the butter too hard, and the salt will not incorporate with the butter as well as it would if it had the right temperature. Mr. Dean says he washes at 58 degrees. If we washed at 58 degrees at our Dairy School our butter would be almost grease. We wash at 52 degrees, and I was telling the studens we would have to wash at 50 degrees. We add the starter when we reduce the temperature to 55 degrees. We leave it at that temperature till we have 4-10 of acid, which is the point when it becomes thickened, then we reduce it to about 56 degrees as fast as we can, leaving cold water enough around it so that it will go down to 52 degrees. We have got to vary the temperature of churning according to the percentage of fat. If we have a low per cent. we have to churn at a higher temperature.

A MEMBER: Don't you think a good deal of mottled butter is caused by setting the butter away too quickly in a cool place?

Mr. STONEHOUSE: I should hardly think that would affect it, because it would not chill the butter right through sufficiently quick to prevent the brine from going through the butter. I do not think the brine penetrates the butter at all after we quit working it If we have mottled butter after it leaves the worker, we will have mottled butter no matter what temperature the store room is.

Mr. MACFARLAND: What effect would it have if we churned each cow's milk by itself?

Mr. STONEHOUSE: I do not think it would have any effect upon the color of the butter or the mottling.

Mr. MACFARLAND: The next time you see mottled butter, you taste the two parts and see if you can detect any difference.

Mr. STONEHOUSE: Usually the mottles are so small it would be almost impossible to get enough to taste.

ADDRESS.

By Prof. Robertson, Commissioner of Agriculture, Ottawa.

I am very glad to be at this convention in London, and this afternoon I propose to deal with some of the underlying principles of dairying, and some of the large policies regarding the management, in order that the cheese-makers and butter-makers may be in sympathy with these larger movements as well as with the working in the factories. I think sometimes the cheese-maker thinks he has nothing to deal with but milk and curd and whey and cheese. These are very important, but if the cheese-maker understands the relationships of these to the larger questions included in dairying, he will do the work and these things more profitably and better.

This dairy business of ours has the promise of great things in it for the people of Canada. At the beginning of the new century I want to say a few things to you about its possibilities. There are more people now in Canada than there were in the United States at the beginning of the last century, and now they have 70,000,000 of people as a market for their products. We have a far better chance to grow now than they had then, because we have all the required experience of one hundred years, and the discoveries and inventions for our use, so that we have a big future. I am not going to discuss that more largely, but there is a big future for the dairymen in Canada with a population of something like that in a like period of time. I won't take more than three minutes more to inform some of the young men regarding the area of Canada, twenty-nine times larger than England, Scotland and Ireland put together. What I want to lead up to is this, that our future is the future of a great country. If you take the whole of Europe with the number 12 as its size, our country is as big as 11, and least one-third of it quite as habitable as the whole of Europe. We go one-sixth around the whole globe.

It is a most convenient and suitable part for sustaining robust life in people, and animals, with soil and climate equal to supporting the very best. I have said these things, because whatever progress we may make, or have made in dairying, has been made and shall be made by the same means that will make for our general progress as people.

In making progress in dairy work and other agricultural work, the difficulties are chiefly those of managing well; and the difficulties become more numerous and greater every year in every part of the dairy business, from the milking end up to the marketing end. To give you an instance. Seven years ago, when I began to run one creamery in the Northwest Territories, I used to get milk from a farmer, I think every fifth day, and it was in a splendid sweet condition. Last summer the man could not deliver the milk as sweet if he sent it in every second day. When you have cows, and milk and the washings of the pails are thrown about, you make the feeding ground for all forms of bacteria life, and the milk will not keep nearly half as long as it used to. Our difficulties are increasing all the while, and to meet these things we need more knowledge as well as a good deal more ability; and when you bring these things to bear, more knowledge and increased ability, then you will see better results. First of all in the product not deteriorating. I want to put that down for the consolation of some men. If we labor under these great difficulties, and if we keep our product from deteriorating, we do a good thing. We show more ability in even holding our own, but if we have to also increase the quality, we show a still greater quality, we show a still greater ability, even if that improved quality does not shine out brightly in a short time. Then the results are seen in the profits or losses. I will have something to say about that in a moment.

At Smith's Falls, a week ago, Governor Hoard gave the results of the cow census in the United States; the census of one hundred dairy herds. In some cases the gross product was as high as about $65 per cow, in cash, from the creamery, and the feeding cost about $35 per cow, while in many of these herds the gross revenue was less than the cost of feed, and I took particular care to observe the selling price of the butter was rather higher than in the case where they had the most profit. These men that had actually got less per cow had their butter sold at half a cent per pound higher than where the man had the more money per cow. I can count a great many more herds now in Canada where there are bigger profits than there used to be. Then let me say this, that whatever progress we may have made through Conventions like this, and through the work of Associations like this, and other forms of help that have been given, the progress is much larger along other lines than on the line of improving the dairy cow.

What we want is increased intelligence. What does a man mean by intelligence? He does not mean knowledge or possession of knowledge, nor even does he mean the acquiring of information. Comprehension, that is what I mean by intelligence, an understanding of the relationship of things. So that a man will comprehend why he churns better at one temperature, and not merely remember that one man said 52 and another man 56 degrees, but he will comprehend as to why he does it, as to why he drains the wash-water off quickly. You can absolutely take away the whole flavor out of butter-fat by soaking it in very cool water several times and running the water off afterwards. That is how they neutralize the stuff that makes oleo-margarine. They soak the fats in ice cold water and run the water off till the fat is absolutely tasteless and odorous. If you leave the washing water standing a short time, with the butter in it, then it will settle on both sides of your churn, and especially in the winter time, and if the cows have been milking a long while a very thick film will form, and you will get one of the worst things to make streaky butter. Every time it is turned over it will make a streak.

I mean by intelligence, comprehension as to why you do things. That is not all; not merely increased intelligence, but enlarged ability to do things. There is quite a difference between intelligence and ability. One means that a man knows how to do a thing, and the other that a man is able to do it. Most of us know a great deal more than we are able to do, and we are able to do a great deal more than we try to do, very often. Then the next method is progress, and in co-operation. I do not mean forming a joint-stock company, and in putting your names on the share list, but co-operation as to having a desire and capacity for working together, in regard to improving the condition and breed of cows, and the economy of producing milk, and economy in marketing products. Then the cheese maker, and the butter maker and the farmer will feel they are engaged in the same sort of business.

To blame a man is to keep him from getting on, whether he be a patron or anybody else. To blame him and scold him will do him harm, but to praise him as far as you can find anything to praise him about, is to lift the man up. Have less fault-finding about the dirty milk and the dirty cans, and a little more praise to people who send clean milk and keep clean cans. Get a little feeling of rivalry on the milk wagon by praising clean cans. I remember the old days when the buyers used to come around and help us. They used to praise the good cheese and say, "Why don't you have more like that?" This manner of scolding men does not help them at all. I do not care where it is done, or how it is done. We are all boys still, and if you take a boy and say, "That is well done, Johnnie," he will try to do better the next time. If you go back twenty years, the exports of cheese from the United States were then three times as large as from Canada. In ten years' time we caught up. In 1899 our exports were three times larger than theirs were. (Applause.)

That is the progress we are making in the markets of Europe. Of course the Americans have been getting a market in their own country. We have been making progress in the actual value of cheese exported far more rapidly than the market to which we are sending has been growing, because in the last fifteen years, while the imports of Great Britain from all countries have increased only 34 per cent., ours have increased 143 per cent. (Applause.)

And if we keep our own share in the British market we will be doing well. While the market has grown only 34 per cent., our shipments to that market have grown 143 per cent. We have grown from $4,000,000 worth of cheese to $19,250,000 worth. I need not point out to you that these are the things that have promoted this growth, increased intelligence, enlarged ability, and co-operation, and as soon as we can put these things into all our agriculture we will make equal progress all along the line. In our butter we have made nearly as much progress. When cold storage was first started our exports were not three-quarters of one million; only $600,000. Up to the end of June last year it had risen to $5,250,000; that is, in five years, and it can keep on growing quite as fast for the next twenty years without in any sense over-crowding the British market with butter, because, during that period the increase has been $15,000,000 that they consume now more than they did five years ago. So that you see there is lots of room for enlarging in that particular line of dairying, and I would counsel you to look to that side of it. Do not confine your factories exclusively to the manufacture of cheese, even in the summer time. Make butter from October on, and keep from making a single

box of cheese until away on in the season. It is good for the farm, good for the herds, and good for the business all around.

In 1871 we had 370 cheese factories, and then in ten years we had 700, the next ten years, 1,400, now we have 3,200. There is room to grow still, and every man can have as much profit if he keeps on making fine goods.

Then there has been a very great expansion of another branch of your business to which attention should be given. The business of growing hogs and fattening hogs. That business began first in the dairying sections. In five years the exports of our bacon have grown from four million up to twelve million dollars, and a great share of that money has gone into the dairyman's pocket. There is nothing better for producing firm, juicy flesh than dairy products, whey or skim-milk.

In our food products from Canada, exports have grown from $37,000,000 in five years up to $67,000,000 last year, and there is no reason why we should not keep that rate of progress up. These are our food products only, and cheese stands foremost.

Now, I must speak of the means whereby that can be kept up. Just how far the management of the soil on dairy farms has been affected by these three things, intelligence, practical ability, and co-operation. What does a man cultivate for? I have known men in many walks of life that have harrowed things, who, so far as I could discern, harrowed only for the purpose of raising dust. You can raise a good deal of dust if you have a pair of colts, but your knees will be tired at night. I did a lot of that sort of thing for my own improvement. If a man cultivates for a seed bed, that is all right. Do you remember when you used to bed a horse? The bed you made for a horse is not the kind of a bed you made for a cow. A corn bed and a wheat bed require different preparation, therefore a man who makes a seed bed for the crop he is going to plant must not merely plow and harrow, but must have enlarged and increased intelligence, comprehension on the making of the seed bed. We must not merely make a seed bed, but a seed bed to help moisture, and a seed bed to be free from weeds, and with regard to rotations. I have read in books of the most mysterious rotations that no man's memory could recollect—14 years' rotations, with nothing in the rotation. Why should a man want rotation of crops? Because certain crops get a better chance to live well after other crops than they would after certain other crops. Then rotation should always mean that when a crop follows last year's crop it should be a sort of crop that can do best after that crop. This was tried in Rothamstead, England. The late Sir John Lawes told me he grew the wheat on one field for 63 years. As we walked along he said to me, "I hope I have not tired you." We had had a long afternoon walk, and he was 93 years of age, and I was a little less. On that farm there was a growth of wheat continuously for 32 years, and part of the land was manured every four years. In a smaller field alongside there was a rotation where the wheat followed clover, and similar crops, and after 32 years there was 114 per cent. increase of wheat crop on the average where there was a right rotation, and the land was in better condition for cropping afterwards. 114 per cent. more, and the land in better condition by giving a proper rotation. It means a lot for growing corn, as well as for other crops, to have that sort of rotation. I find very few farmers who have ever understood that problem.

There are different processes of growths in plants. There are two processes of growth in all plants. One of the processes or one of the qualities in growth, means for the growth and enlargement of what I will call the vegetative part of the plant. That is for the root, and the stock, and the leaves. The part that dies when the plant is matured.

There are parts of plants that do not die, otherwise the plant would perish utterly off the face of the earth. The seed carries the life over. It is another sort of thing. It depends a great deal on whether a man wants the vegetative part of a plant, or the seed part, for his purposes, that is, for the rotation. When a man grows corn, in dairying he wants the stalk and the leaves and the ear, but the ear is not so important. He is after the vegetative part mainly, to put in the silo. Now with turnips and mangels it is the same thing. When a man wants that part of a plant, these plants are all the better for deep cultivation, and deep seed beds, and all the manure a man can heap on the field, because no one ever knew a crop where you wanted the vegetative part of the plant to grow, to be over manured. If you see a bunch of oats growing on a dung hill, what kind of a plant will you have? A huge bunch of oats, with stalks as big as my finger, and

hardly any seed in the head. Where you have abundance of manure, you promote the growth of the vegetative part, and you are keeping back the seed part.

Take another instance. Go along the roadside and pick up a little slip of timothy, red top, or June grass, and there you will find, where the food is scarce and the moisture is scarce and the seed bed very unsuitable and hard, if you pick up that plant, nearly half the plant is seed. Where the food is scarce the plant seems to exert every activity to keep enough for the seed to carry its life over. Quite different from the oat plant in the dung hill.

Now, if a man gets hold of these principles, he will get the right rotation. He will manure for the turnip crop and the corn crop, and he will never plow after these crops for a grain crop. When a man cultivates between the rows of corn he makes the very nicest pulverized seed bed, $2\frac{1}{4}$ inches deep, and if he goes through that five inches with a plow the wheat plant cannot get it till late in the season, and the wheat plant needs a start for the first two months, and most of the grain crops the same.

Comprehension there will enable a man to make the right rotation, and save labor and increase his crops greatly. There is no crop in this country better for a preparation of this kind, enriching the land, than a crop of clover, or any plant like that of alfalfa.

I want to say a single word about the cultivation of some crops, and the effect it has on their growth. Take a piece of corn and cultivate frequently between the rows, and leave part of the same crop uncultivated, and you will find a difference of 86 per cent. more crop on the same field in the cultivated part, because all crops take their food in a liquid state. Every ton of crop that comes into the barn represents not less than 300 tons of water that have gone off from the plant into the atmosphere. For every ton that comes into your silo these plants have sent through their stalks and leaves no less than 200 tons of water. Every ton of grain that comes into the granary means 500 tons of water that has gone from the plants.

The late Squire Wheaton walked through his field and picked off all the large ears, and hung them up in the woodshed to dry for next season. That was an excellent plan; but a more excellent plan is not to take the length of the ear as evidence, but to take from plants that are big and vigorous and have two ears apiece, and by that sort of selection in less than three years, the yield has been increased 25 per cent.

How would a man improve his dairy herd if he always took the heifer that was the largest when it was born? You select a heifer from the cow that is giving the best milk, so in every case when a man picks from the best plant, and sows seed from that, he builds up his best plants. If you pick the life of the best plants, it will transmit the quality of life inherited, and it makes a big difference.

Do you see these two bottles of peas (holding samples); the pea from which these came. The one is a cross between two different sorts of peas, the mummy and the black-eyed marrowfat. The plant is inside the pea. Now the peas from that vine in 1896 were selected, and all the big peas were sown by themselves, and the small peas sown by themselves. In 1897 the large peas were selected and sown, and the small peas selected and sown, and the same in 1898, and these represent the average of the crop from '98, from that three years' selection, and by actual weighing, the large peas weighed nearly twice as much per pea as the small ones.

Mr. C. A. Zavitz at the Agricultural College at Guelph, has been doing some splendid work in that line for several years. You should get his reports and read them with care on the point of selecting seed.

I want to come down to the management of the factories, in the progress of dairying the whole atmosphere of the place gets filled with germs of all sorts, and, as far as I can say with regard to making cheese with success, it is a good plan to try and keep the milk from ever being above 70 degrees except during the time it was in the vat or sink, because above 70 degrees you permit certain fermentations that give you bad smells and bad tastes. You never know when these things will come into activity, so it is a capital thing to try and prevent it from being heated higher than 70 degrees. If the milk be kept continuously under 70 degrees you will very seldom have any of these flavors that they call bad flavors.

With regard to making butter. When one speaks of ripening cream, what does he mean? Merely allowing fermentation to go on. Sometimes he adds fermentative starter. Now, that starter will keep on working in the butter, unless there be some fermentative

stopper added, or effected by means of temperature. So the only safe way to keep butter after it is made is to have the butter, when one day old, put in a place where the temperature will stop fermentation. That is the reason why the cold storage has helped our butter trade. Butter is never nicer than it is when it is two days old. If you can hold it there by keeping it cold until it has to be eaten, then you stop fermentation.

Speaking also about creameries I may say that we make a great deal of butter in the Northwest, nearly all from gathered cream, distances wide apart. No occasion to boast of the kind of butter we make. We do not want you to know what kind of a market we have, because we have only enough market for our own product. We turn out 33 car loads from May to October, and we will be able to pay the patrons at the creameries a selling price a big fraction over 20c. a pound for our May, June, July and September butter. We have done well, because the quality was good, the quality was first-rate, and now we have learned that there we do need to pasteurize cream. It has been counted impracticable to pasteurize gathered cream, because the cream would thicken and would not work well. We have no trouble in pasteurizing cream in a small quantity if we pasteurize it after it has ripened, and then cool it and add it to any other cream. We ripen the cream first, and then pasteurize it to kill off all these germs together, and then add it to the other cream.

I have had occasional complaints from England that Canadian butter landed in London is mouldy between the boxes and the butter on the paper. I have known cases of that mould going four inches into the butter. That was one of the most serious difficulties we had to overcome in the Northwest Territories, because we took over some creameries that were filled with mould germs; but since we have adopted the practice of soaking the paper in brine, and adding about 3 per cent. of formalin to that brine, we have absolutely stopped all sort of growth of mould on these packages. So that this year, out of an output of something like 18,000 packages of butter—because we put up a good deal in 14-lb packages—out of that quantity we have not had a single case of a speck of mould on one of our packages. Of course you must keep good boxes, well made with good, dry lumber; soak the butter paper 24 hours, and then you can keep the butter entirely free from mould.

Now, I want to say a little about the cheese trade, with regard to its present condition. We have not paid very much attention to the main part of making cheese, that is the curing. The flavor, of course, is a most important quality in cheese. Nobody wants a cheese that looks nice and is firm and salted and close and true to color all the way through, if it has a bad taste.

Flavor is an important quality, and the flavor is developed during the curing. I know that the conditions, before the cheese goes into the curing-room, affect the growth of flavor. Still, the main condition that makes for good flavor is the temperature of the curing-room. During the past summer we controlled the cheese of one hundred factories. Every day's make out of every vat was put into three portions; one portion went into the curing-room, where the temperature was never allowed to go above 65°, another portion put into the ordinary curing room, sometimes the temperature going up as high as 82° and 84°, and sometimes 86°, and another into a curing-room like the worst curing room of an ordinary cheese factory, an upstairs room, and there sometimes the temperature would go as high as 95°. That was kept up six months, and in no single case—and I examined every day's make—in no single case was the flavor of this cheese as bad as this cheese, or that cheese—pointing to different samples.

Once in a great while the high temperature did not spoil the flavor; there seemed to be nothing in the cheese to get bad. But in about four cases out of five, this cheese had a nice, clean, passable flavor, and this one was heated and just going up. I submitted this cheese to a body of experts in Montreal, who valued them. They were kept in the cooling room until the youngest was three weeks old. They were shipped out every fortnight. Their conditions were alike, except the temperature in these three rooms, and that committee said, in examining these cheese, that the difference in value was as much as one cent a pound between these cheese and these cheese [comparing samples] and these cheese lost a pound less a box in shrinkage that these cheese, and about 1¼ or 1½ than this cheese in the upper room. We had some of these cheese at Smith's Falls, where the difference was quite apparent. In fact, the buyers said our June cheese and July cheese cured in the 65° room had as good a body and flavor as fine September cheese. Why?

Because they were made out of clean milk, and they had a September temperature. That is the reason the English cheese has such a marked advantage over our cheese, because the temperature very rarely gets above 65 degrees.

If you will take an ordinary curing-room, where a factory would handle 300 cheese a month, that is a difference in value, counting only half a cent a pound, in three months, of $405 on nine hundred boxes of cheese, saved to somebody, as well as a far better quality of cheese put on the market, keeping the general price up, and enlarging the general demand. How much will it cost? The cost of the lumber and paper for such a room would be $215, the lumber at $20 M., and that includes the labor and the cost of double doors. Doors in the summer to keep the heat out, just as you have in the winter to keep the cold out, and double windows. Line the room clean around with two ply lumber, and two ply of paper, and two sub-earth air ducts to let the cold air come into the room. In the very hottest of weather we never had that curing room above 58°, when the thermometer in the shade would stand at 95°, and sometimes higher. By having two sub-earth air ducts like that, and opening the windows carefully early mornings and late at night, you will have no trouble keeping that curing room down to 65° in the hottest weather. The whole thing included is about $335, and the saving in one year's work is $405. When that thing is done once it is done for twelve or fifteen years, and there is no expense in operation. We used ice for a short time to supplement one of the earth ducts, but we found it cheaper to put in another sub-earth duct. That is one of the things I would like to see the whole of Western Ontario do. Have the temperature in your curing-room kept down to 65° if you can. It is worth a great deal to the cheese trade in keeping out this heated flavor.

A great many of the cheese we had last year had this greasy flavor. It may have been caused by the way the cheese were carried on the railway and on ships. We had in Montreal last season two men to watch the loading of the ships, to find out how the ship owners loaded apples and cheese and butter, and large quantities of the cheese were carried into the hulls of steamers without absolutely any ventilation to them. We have been urging that on the steamship owners for years.

We had four men in England at the various ports, Glasgow, Liverpool and Manchester, to report on how these shippers unloaded their cargoes from Canada. In many cases the cheese came out greasy from the boxes. It has made the English this fall as touchy as a bear with two sore heads. He is touchy all over, and he won't take anything that does not pass his most critical judgment. The fault is somewhere between us and him for some of these things. 2264 boxes out of one ship, scale boards greasy, and appearance spoiled; 2130 cheese out of another ship, scale boards greasy, and appearance spoiled, and flavor over developed by heat; 4429 out of another ship, Aug 14th. Most of this shipment badly heated, grease coming through the boxes, and flavor badly spoiled.

I can give you such a torrent of lamentations as would make you sad for about a week. It is sad it should be so; still it is a fact. It is what these independent men tell you that they saw. Let us get to work and do our part, have our curing-rooms properly cooled.

I have the authority of the Minister of Agriculture to tell you this, that if the cheese makers will keep the cheese below 65° in the curing-room he will arrange with the railway and steamship companies to have them carried to England at that temperature. (Applause).

When the butter-makers made the cold storage at the creameries right, and there are over 413 of them in Canada, the Government provided cold storage cars for butter to Montreal, and cold storage departments on the steamships. If the cheese-makers will make their curing rooms adequate, I don't think you need fear that the Minister of Agriculture will give you transportation facilities, because the steamship companies said they would put on the fans if our Department would give them similar help to that we have given, and I am authorized by the Minister to say he will do that, if you will make the improvement at your own places. It would not do much good to have the cheese cured at 85° and 90° go into a place with other cheese that were properly cured for the sake of warming these other cheese up. So you must all pull together and begin at the curing room. They say, why don't you put in ice, that I used to think was necessary, but which I found was not necessary. By actual test there has not been absolute stillness more than two hours and a half in any twenty-four hours, eighteen feet off the ground. If you have a cowl on ball bearings that will turn with the least bit of breeze,

any cheese maker can keep the curing-room under seventy, and with extra care under sixty-five.

I have another communication from the Bristol Provision Association, saying that we people in Canada must send cheese in better condition or we will lose ground, and the main complaint is this hot flavor and the want of good boxes.

Cheese around this neighborhood are known as Ingersoll. Now, the cheese from the Ingersoll districts and Prince Edward Island are the two kinds of cheese that stand out as having the best boxes, and the Prince Edward Island boxes are the best. They are made of birch instead of soft elm. They do not split so readily, and the cheese are made the right size to fit the boxes. I took out several different lots in Montreal going on a ship. They made 786 boxes, and of these there were 101 boxes that had been broken and recoopered and tied up with ropes, and 85 boxes that were still broken and not recoopered or tied up with ropes. A showing of 186 boxes broken when going on the steamer, and I could read you letters showing that out of some steamers the cheese was delivered on the wharves of Liverpool and Bristol, and no less than forty and fifty per cent of the boxes broken, as many as four thousand boxes coming out of a ship with that proportion of broken boxes. It will be most disastrous to our trade unless we remedy that sort of thing. If we cannot make a stronger box out of this elm, get something else. If you cannot get a box well nailed for 11c, pay 15c, and get enough nails. We went to the ship owners at Montreal and said—"Why don't you put on men to handle your cheese well, and put them in chutes, and see that there is a bag at the bottom? Why do you insist upon having a big sling that hoists them up and then drops them into the hold? Why don't you have a platform like the Manchester liners have?" And every one of our steamship lines got one of these things after the second trial, and still they have fifty per cent of the boxes broken. Sometimes we have reports of a hundred boxes where the brand was undecipherable and boxes dirty, apparently rolled on a dirty wagon, and then we have reports of cheese landed in a heated condition. This is a condition of affairs that calls for increased intelligence, and improved ability to face these difficulties by getting better boxes and better conditions of handling. We must all pull together, the box maker and the cheese-maker and the patron. If the cheese-maker does not get enough pay to get a good box and the living besides, he will have the living anyway, even if it comes out of the box, and if it comes out of the box it comes out of the patron six times more. Half a cent a pound does not make up for a bad box as against good boxes. There is room for improvement, especially in our curing-rooms, and in the boxing and caring for cheese.

We have not got to the end by any means in this dairy business. We have far more to learn in regard to comprehension. Then this question of increased intelligence is needed in regard to handling milk from the very bottom upwards, until it is laid in the English markets, and in the making use of the by products so as to have the pigs on the farm and the calves and these things raised in the best way to contribute to the general welfare, and we should join to that the raising of chickens. I would like to live long enough to see our chicken business come to ten millions a year. The demand in England is for cold ham and chicken. If a man ask you to supper at a restaurant in England it is cold ham and chicken. The richest districts in England are where they are raising chickens. We sent over this year two thousand, fattened on skim milk and ground oats, and they have been selling for seven pence and seven pence halfpenny a pound, 14, 15, 16 cents a pound. We got as high for some chickens as $1.20 wholesale, and more were wanted. (Applause). That is a business for the cheese makers to take up, and the butter makers to take up. Let the chickens come to a centre, like the cheese factories, to be fattened, and that will get rid of this thing of having bad smelling pigs near the creamery. If you had chickens there, they would give you far more money. There is more chance for growth now than there has been before, and it is for us to apply ourselves to have this intelligence and comprehension, and to have the farmer make himself capable of doing all these things. Let us all pull together for the good of this business, and I am sure you will have still enlarged profits and much better satisfaction. (Applause).

ADDRESS.

By Mr. Derbyshire, Brockville.

We have heard throughout the Convention that we are not making progress in connection with our dairy business, and that there is great difficulty with our boxes, and in connection with our manufacture, and in connection with our factories; in fact everything we have heard from the platform seems to be, we have not done all that we ought to have done in connection with the dairy business. I believe the reports, as we have had them, show that we have not done as good work this year as should have been expected from men who have taken the prominent place we have, in connection with dairy matters, for the last quarter, of a century. I am satisfied that the lessons we have learned at this Convention will do us good, providing we go home and put them into practical operation. I was thinking, when Prof Robertson was speaking this afternoon, and showing there were 45 per cent. of the boxes broken when landed in England—I was thinking of what I heard Prof. Roberts of Cornell University say at one of the Conventions on the other side. He quoted from Proverbs in connection with Solomon, and went on to show that Solomon was the wisest man that ever lived, and that Solomon in his wisdom drove out through the country to inspect the land, and to inspect the husbandry, in connection with all his territory, and he said, "And I passed by the fields of the slothful, and by the vineyard of the man void of understanding, and lo, it was all grown over with thorns and briars, and they covered the face thereof, and the stone wall thereof was broken down." And this was Solomon. He went by these fields and different vineyards and saw the utter desolation of the people; and if Solomon were living to-day, and if he would drive out through our factories and creameries in the Province of Ontario that we feel so proud of, he would say, "I passed by the factories of the slothful and by the curing-room of the man void of understanding, and lo, it was all covered with thorns."

I have not the slightest doubt but that there are a great many more things we could do if we were more united, and I am satisfied we could improve the industry marvellously if we would only try. We have had the successful season in dairying. Farmers have received more money, and have done a better business in connection with their dairying this year than they ever did in the history of our country, and I was wondering how these things could be reconciled. They get more money and place more cheese on the market.

The first four months make of our cheese this year was the finest of the world (though during that time we had exceptionally good weather, had good grass and everything in our favor), and I was thinking if we could take another step in advance, and keep that up all the year round, we would be away ahead of our competitors. During the last ten or fifteen years we have stayed out of the way of any man making fancy cheese. We have been furnishing a better article, and have placed it on the market in better condition, with a regularity and system that was not paralleled in any other market, so that we walked right ahead up to 143 per cent. We have increased our exports in that proportion while the consumption of the English people has only increased 39 per cent. 75 per cent. increase will cover the butter we are furnishing at the present time. We can improve more widely in that direction than any other just now, and I believe, when the Minister of Agriculture for this Province comes here and speaks, as he did last night, words of encouragement in connection with the business, and when we know that he has never refused the dairymen of this Province money, and is willing at all times to give us every advancement he can if we use it to advantage, and when we have the encouragement of the Dominion Minister of Agriculture who is assisting us in every way, and who has come right forward not only with men, but with money, in connection with our business, we will each put forth our best efforts, each in his own sphere, to develop this cheese and butter industry to the utmost.

This last year we have had a great acquisition to our dairy staff from New Zealand, in the person of Prof. Ruddick, one of the best educators in connection with our dairy business to-day, and we should feel proud to think the Minister of Agriculture for the Dominion had the wisdom and the foresight to bring this man back to put him on the staff, so that we can take further steps in advance in connection with this business. This year the Minister of Agriculture for the Dominion offers to give us ventilated cars to put

this cheese on the market in first-class condition, and he offers to give us refrigerators direct from the factory to the final port of shipment; so I say we have the greatest possible encouragement in connection with our business, and it rests with us to say whether we are going to hold the business we have got now. I feel that the man who has helped us in the past will help us in the future, and in 1901, the commencement of the twentieth century, I believe men in the dairy business will unite, I believe they will tear down their old factories and put in a proper system of sewerage, and put up new factories, giving us better products; and I believe the men, the farmer who is engaged in this business, will do better in the future. We must teach him and get him to understand that there is a difference in cows, that a cow that fills a stall is not a cow unless she does the work of a dairy cow. I think cheesemakers should be so educated that they will be like school teachers in the different sections of this country, that they will be the educators of their respective sections, and show a better way to produce, and how to produce, the most milk, and in every way promote harmony throughout the section. Now, they say the weakest link in the chain is the link that wants to be attended to at once. I believe the weakest link in the dairy business to-day is the man on the farm. We have men supplying milk to different factories who are producing from 6000 to 7000 pounds per cow, and we want all the farmers raised up to this high standard. The stables must be improved so that the animals will be healthy. Half the stables in this country are not fit for the habitation of intelligent dairy cows. I was thinking, when our friend was talking on the delicate pieces of mechanism that produced that large quantity of milk that if the cow, Brown Bessie, were into a stable such as some in this district, she would be perfectly worthless.

The cheese-maker can go to our different dairy colleges free of cost and become expert in connection with his profession. Anyone that expects to make money, or make a living, at any certain business in this country ought first to qualify himself for that business, and I believe it is the duty of the cheese-makers to first go to one dairy school and become thoroughly educated in connection with the business so that he may be intelligent, and do the best service, and turn out the finest quality of goods There is no money spared in supplying the very best talent in connection with our dairy schools. On our platform we have Professor Dean and other men who have devoted their time to this business. I believe young men from the farm should be sent to Guelph. We have that magnificent college in the Province for the purpose of educating young men for farm work so that they can take their place in society with the lawyer, or any other professional man. No business man in this country requires more talents than the farmer who has to deal with these delicate articles, these articles which require great skill in their production. The welfare of agriculture depends upon the men on the farm, so they can raise more hay per acre, have more money, and be better business men. We want to educate all our people and bring them up to this high standard, so that we can walk to the front and take the position Canada should have. We have a great many dairymen and a great many factories in the country that I do not feel proud of. You would think by looking at these factories that they did not think it was a staple business. I believe the production of the fancy cheese and butter is one of the finest businesses in the world, and most staple business. I believe wheat, which has been the standard article from the first, is no more a staple to-day than butter and cheese.

I wonder if, after all the talk we have had at this Convention, these people will go home and use the same old curing-room where the atmosphere is the same outside as inside, from which they can look up and see the heavens above and look down and see the earth beneath; where the washings of the vat are running right down on the ground, saturating it so that the smell of that place is not fit for the storage of human food. I wonder if these people will do that?

A Voice: No, sir.

Mr. Derbyshire: Give me your hand. I love that sentiment. According to Prof. Robertson, a man can fit up a factory for between $400 and $500. He can refit one of these old factories, and put in a sub-earth duct, and put in a proper system of tile drainage, and put that factory in first-class condition for between four and five hundred dollars. In 1901 anyone of them could produce in the quality of the goods alone, enough to cover the expense. Now, I want to know if anybody is prepared to go on with the old factory. There is a tendency to put advertisements in the papers, asking makers to tender to do the work for such a factory, and the lowest man is getting the job. Do you think that

is right? I believe that is the biggest curse in connection with our business,—looking for the cheap men. (Applause) What would I do, or what would you do, if you had an old factory, and if you were responsible for the quality of the cheese being turned out? We would hire the very best skilled man we could get, who had attended the dairy school, a man who was above reproach. That is the kind of man that ought to be hired and wages should not be considered. These factory managers are bringing the most delicate boxes possible, and in a great many cases they are poorly made because they cost little. They are trying to cut seven rims where they used to make four before. Unless the box fits the cheese exactly, and unless the lid drops down right on top of the cheese, that box is going to pieces before it gets to Liverpool, but if the cheese fitted tightly, and if the box is properly nailed, and if the lid drops down on the cheese that cheese will go to Liverpool whole, and that article will sell better in the Old Country. Every box must be clean and tight; have the weights stencilled on, and the weights should hold out when the cheese is turned out of the box.

Without the confidence and co-operation of the people in England we cannot succeed. During the past year 45 per cent of our boxes have been broken. Is that to occur in 1901? Before we make our contracts we should go to the box maker and tell him we must have a better box, and then make the best bargain you can after you get the quality you require.

Then we must have the curing-rooms fixed. We must have sewage carried off. We must have the best men; men who will not be afraid to visit the neighbors, who are sufficiently educated to give the proper advice to the farmers, so that everyone will be benefitted, ourselves also, in connection with the business, and which will place us beyond the reach of the ordinary man who makes cheese.

Now, if we can produce 6,000 lbs., it is for us to do it. I believe, from what I know of the Canadian men, men who have taken such a prominent place in the past, they will come to the front this year, and see to it that the very best article is produced, and that the name of Canada will be what we have made it in the past, famous on account of the article we have made, and that 1901 will be the greatest year in the history of the dairy business of Canada Now, if we can produce 600 lbs., or say 1,000 lbs., per cow more milk in the season you would make $5,000,000 more next year. That would make the product reach $30,000,000, and I believe there is not a solitary man who is furnishing milk to any factory but what can help do it. Go to any city or to any place throughout this country, and you will find men tumbling over one another, to hire out at 90c a day, thousands of them ready to take the job, but if Van Horne happened to drop off, and they wanted a $50,000 man, how many would make application for his place? This ordinary man is no good in this country. It is the man who has educated himself to take the first position that is required. I hope the dairymen will place themselves in such a position that their services will be demanded. In one factory in the East they had a man for 15 years. Every year he has been doing a little better work promoting his business, and his services, which are required in that factory, and he gets respectable pay and can afford to stay in the business. We know that the ordinary cheese-makers going through the country to-day will work for anything they can hire for. They get into the factories and destroy the business. I say, do not hire an ordinary man. When you get the man that is fit to do the business, pay him properly, and then we can take a step in advance.

The CHAIRMAN, 1st Vice-President, A. WENGER: I am sure we have all been delighted to hear Mr. Derbyshire. When a farmer brings in maple syrup to sell you pay him for the flavor, and the same idea applies to dairy goods. They want the finest goods for which they will pay the best price.

ADDRESS.

BY MISS LAURA ROSE, DAIRY SCHOOL, GUELPH.

Men are not so well content to be merely practical, as they used to be, but in this day of general discussion and information the man who seeks some basis of argument on which to get strength to explain his practice is safe. Knowledge is often despised by the uneducated, clever, practical man. It is regarded with childish wonder by the foolish, and it is only truly appreciated by the wise man. True, knowledge alone often misleads

the student unless he tests his conclusions by actual experience. The aim of knowledge should be, to supplement and improve our natural gifts and inclinations. Some people hold to their opinions dogmatically. They are averse to being taught, or to adopting anything new. Let it not be so with us as butter-makers. Rather let us hold our methods and ideas in solution, ready to adopt anything that is more valuable, and prepared to modify or reject, on any advent of further light on the practice which we now follow. We must welcome every fact to our dairies, and let us cultivate the good common sense, which can work revelations without making ravages. Many who have only a theoretical knowledge have killed a flourishing industry by constantly making ridiculous changes. A man enters a community. He has elaborate ideas on what a creamery should be, but having no practical experience, the results are not at all satisfactory, and he leaves the business a poorer and a wiser man. Some one has said that knowledge is valuable in other ways, as a source of pleasure, as a means of giving grace and beauty to life, as an instrument to help us in the passage of our days. All three can be applied, or made to apply, to butter-making. Knowledge should add pleasure in our work. A little incident that occurred not long ago will illustrate this. I was visiting at a farm house where lived one of our lady students. Her mother told me that Belle had taken no interest in butter-making before going to our school, but after she went home she took great pleasure and pride in looking after the milk and making the butter; and the mother attributed it solely to the knowledge she got at the Dairy School.

Then you would think the knowledge of the art of butter-making would not add grace and beauty to life, but it does. Knowledge gives the finishing touch of refinement to work. We can do things better, we can do things more gracefully, and we can have better results. Then again, it is only the educated palate that can fully appreciate the beauty and flavor of a good piece of butter. I was talking to a lady with whom I discussed pasteurizing with regard to driving off turnipy flavors. She said I do not need to pasteurize my cream because my husband cannot tell a turnipy bit of butter from any other kind, and I said it was a great waste to feed good butter to such a man. It is only the educated person that can catch that fine, delicate aroma, and can admire that beautiful texture in a real good piece of butter.

The man who has knowledge is able to give a reason for doing a thing in a certain way, and he is not like the majority of women, you know. When a woman is asked why she does a thing just so and so, "Oh, well, just because—" That is about as far as she gets

Now the man who can give a better reason than that can do his work better, and he can add very materially to the wealth of his country.

Why is it that our butter is meeting with such a favorable reception in the British market to-day in comparison with a few years ago? Is it merely on account of co-operation, and because our butter-makers are having more practice? I say no, but it is rather owing to the fact that we have a clearer and better knowledge of the requirements of the British markets, and it is owing to the fact that we have a knowledge of how to fulfil these requirements, and so meet the demand and secure the market.

Butter-making is no longer the guess work that it used to be. Our grandmothers and our great-grandmothers thought that if the butter did not come a witch had taken possession of the churn, and must be driven out by a red hot horse-shoe, and they put the red-hot horse shoe into the cream, by which they raised the temperature of the cream, which was likely at too low a temperature. They raised the temperature, and the butter came, so they thought the witch was driven out. All that was needed there was more intelligence. Had they had it they would not have practiced that method of increasing the temperature.

Why is it that our young men are crowding out old men who have grown old in the business? This is a serious fact, but it is a fact, that young men out of their teens are taking the positions of other men who have grown old in the business, and these middle-aged men fear the silver threads among the brown just as much as does a maiden of uncertain years, and are seeking a remedy, perhaps in some "Hair Restorer," and is it not the keen competition that is making it necessary to employ the highest skill and the latest improvements? And the young men, seeing this, are rapidly qualifying themselves to fill these positions, and are crowding out the older men. The perplexities in butter-making arise largely from imperfect acquaintance with the conditions and materials with

which they have to deal. Impossibilities, with further light, turn out to be only difficulties. During the past 50 years, scientists have done more for dairying than for any other one industry in the world. I think it is true that there is no other one branch of agriculture which has received such attention as dairying has. The important part that the action of bacteria in butter-making plays has only been made use of extensively during the last quarter of a century. The knowledge relating to this microscopic organism has reduced butter-making to a science. I do not think we fully appreciate, as butter-makers, the efforts of such men as Dr. Connell, Professor Harrison, and Professor Russell in their efforts in our behalf. Through their efforts the temperature at which certain forms of bacteria develop are determined, and they give us the results. They have also given us the temperature at which the best results in our work can be gotten.

The cause of gassy milk, bitter milk, and these bad flavors, are no longer mysteries since the search light of the microscope has been turned upon them. I might also mention the Babcock tester and the cream separator that have more materially aided in increasing the profits of butter-making. It is only by reducing the cost that we can increase the profits. Supposing all the milk that is now manufactured in our creameries were set in the old fashioned shallow pans and skimmed with the old fashioned perforated skimmer, consider what a time it would take, and consider the great loss of butter fat that would be sustained. But now we have the separator doing that work, enabling us to handle a much larger quantity of milk than would be possible with our old methods. The cream separator recovers from the milk the greatest amount of butter fat with the least expenditure of time, money and labor.

The Babcock milk tester may be called the dairy detective, revealing to us the per cent. of butter-fat in the milk, and showing to us which cows are profitable, and it also reveals the loss of butter-fat in the skim milk, and points out to us where we can do better and more careful work.

Experience counts for nothing unless the lessons taught are made use of in the future. I would like to impress that upon you. We hear a great deal about experience, the practical men of experience, but I say that experience counts for nothing unless we have our eyes open and can profit by our experience, seeing where we have been deficient, trying to get at the cause. This is the way knowledge comes in.

There is no branch of agriculture more intricate, or where there is more need of scientific and general knowledge, than in dairying, and especially in butter-making.

A sample of butter may be defective owing to the cow, or owing to the feed, or owing to the surroundings, or perhaps to the skill of the maker. A practical man can detect the fault, but it is only a practical, educated man that can give the cause of the fault and supply the remedy. My experience with butter makers proves that practice alone is not sufficient for effective and economic work. In my work at the College I come in contact with men and women who have made butter for 10 or 20 years, and perhaps longer, and I am just astonished to see what lack of knowledge they have with regard to the properties and care of milk, and of the general principles of good butter-making. I am just astonished to see the women who come there for a few weeks and find how much they can be taught, after they have made butter at home for 10 or 20 years.

A student of ours wrote to me last summer saying she had been making one-third more butter from the same quantity of cream or milk than she had been doing before attending the school. That seemed a large percentage of gain, but I had every reason to believe that what the girl said was true. She accounted for it in this way. She said she had skimmed her milk very much more carefully, and ripened and churned her cream in a different manner. She used to say to me, "O, Miss Rose, I have lost a lot of butter fat." She could see wherein she had erred, and she was a careful, good butter-maker. She had had plenty of practice, but she lacked knowledge. Arguments are pillars, illustrations are the windows that let in the light, and it is just only for these reasons that I care to make any personal references.

When we can draw from our own practical experiences, the illustrations come with more force than those we have merely read about. Most of us have plenty of practice as butter makers, and what do we practise? We practise the same methods as our mothers used, and they practised the same as their grandmothers, and unless we get out and find out what other people are doing, we cannot hope to make improvements. Improvement

lies in finding out what others have done, and in going a step beyond that, and we cannot do that if we merely stay at home and just have practice without trying to gain knowledge. Knowledge and practice go hand in hand for effective work. Without knowledge, and merely with practice, we are apt to make some rather sad mistakes. I saw quite a laughable one last summer. I was visiting at my brother's farm in North Dakota, where they had a new Swede girl, who did not know the English language very well. My sister-in-law sent one of my little nieces to see that Annie put the coloring matter into the churn. Little Violet returned into the room laughing, and I said, "Why, Violet, what has happened?" and she said, "Auntie, what do you think Annie has done?" and I said, "I am sure I don't know." "She has gone and put strawberry flavoring into the cream." She was up to the practice of putting coloring matter in, and the poor girl could not read English and had flavored the butter with strawberry flavor instead of putting in the usual butter coloring. Just such serious mistakes will occur if we separate knowledge from practice. Then let us, as butter makers, get all the knowledge we can from whatever source we can. That is the one great benefit of such meetings as we are having here. We get together and talk of our practical experience, and are gaining knowledge, but, as I have said, this knowledge will do us no good unless we go home and put it into practice. We can talk and talk, but unless we DO we are not of much good in this world. Let us see if the little hints we have gathered here are better than our own, and, if they are, let us adopt them and make them our own. "Who does his best as circumstances allow does well, acts nobly; angels can do no more." Let that be our aim.

ADDRESS.

By Hon. John Gould, Aurora, Ohio.

We are standing here at the beginning of the twentieth century. We are standing here as dairymen in a united position before the world, furnishing the world more and better food from our dairies than has ever been furnished before. We have crossed the threshold of the old century into the new, and we have brought into the new century with us a wealth of dairy invention, dairy apparatus, and dairy knowledge, that I doubt if the next century will equal; yet still, with all this machinery, and with all these Dairy Schools, and all these facilities of transportation, nine dairymen out of every ten milk no better cows than their grandfathers milked a hundred years ago. I believe we have made more progress along every line of dairying than we have in improving the dairy cow. The world is asking us to-day for more dairy produce and for better dairy produce. The world is recognizing the fact that the milk of a cow is a perfect food, and that no other food approaches it in digestibility. While we have not recognized this fact until very recently, and whilst you are lauding Canada, and telling how you send your good butter away to England and send your good cheese there, and while you show you are shipping abroad three times more cheese than the United States is doing, that is all pretty good; but I want to stand right up and say that the Americans on the other side are eating three times more cheese and three times more butter than he was eating ten years ago, and that we do not have to go abroad looking for markets. Our markets are right here, and last election we saw that we would have a home market for four years more, and are going to double our products and develop our population in the next hundred years or less. I want to tell Mr. Derbyshire that we sent only a little butter away, only nineteen million pounds of the very poorest we had. We sent it over to Europe for manufacturing purposes, and had it made into buttermilk soap; had it sent back to us and rubbed in. (Laughter). I will tell you there was more pleasure in the last half of the operation, than there would have been in eating the confounded stuff. It is only within a very few years that the dairymen on the other side of the border have come to recognize the fact that dairying is simply the commerce of a cow. We have only begun to recognize that it is this little cow that is bringing Canada nineteen million dollars of spending money; bringing the United States five hundred and forty million dollars of spending money. I say that we are only just recognizing that the dairymen are just occupying a very inconsiderable place. We are only just realizing that we are trying to

sit down beside the cow's side and to make ourselves believe we are her calf, and I say that we must ingratiate ourselves into her affection. Any man who does that stands before the world as the greatest dairyman of them all.

If you should go up to Wisconsin some day, as I have done, go up to Goodrich's farm and see the amount of affection that exists between Perry Goodrich and his cows, you will understand why Perry Goodrich stands the peer of any dairyman in the United States. (Applause)

The lady who spoke to us so admirably, simply voiced that great question—"Investigation"—going a step farther each day, and in that way always getting a step farther, so I want to say to-night, and what I say I am responsible for. I do not know what your cows give, but I apprehend it is no better than the cows in the States give. I have been making investigations along the line of production, and have some figures at my home which show something like 1200 creameries and cheese factories in the United States in 1898. And the annual product for all these factories was an average of 3,200 lbs. of milk delivered at the creameries and factories for all these dairies, and from these figures I figure up, and I find that the cow in the States eats, in hay and grain and butter, something like $35 worth of food in a year, and then I balance that up, and don't you see the average cow of the States is producing about $24 worth of butter and milk and cheese during the year, and that is giving $9 a year for the privilege of associating with that cow for a year. And yet these nineteen million cows last year made us more than five hundred millions of dollars, and the dairymen of the United States last year received more for butter and cheese per pound than they received any year before, and we attended more political meetings, and dressed better, and buried our mistakes later on, put more money in the bank, had a better time than we ever had, and yet we were milking a cow that gave $9 less milk than she ate food. It is like the fellow who took a job of cutting wood at fifty cents a cord and let the contract for fifty-five cents, who said it was worth five cents to boss the job.

I wonder if we thought it all over and examined ourselves, would we think a man would find his insignificance quicker by taking a lead pencil and a piece of paper, and shutting himself up in a room and trying to estimate what he knew, what he was worth, and what he was good for, and then apply it to his business and see if there was not some connection somewhere between the diameter over his ears and the results of his business. I believe if the dairyman of to-day had a pencil an inch and a half long and a piece of paper, and would figure along the line of production and the cost of production, that his pencil would be worth to him $1,000 the very first year. I have got the pencil to start with, and I have been thinking along these lines, and I say that the man on the farm knows all the other animals better than he does the cow, that makes him the most money. Now, there is not a man here to-day but knows the difference between a draft horse and a trotting horse, and I think the gentleman down in the front here would not buy a Percheron horse for a driving horse, but that he would take a Percheron horse to move a big load; but if his wife were sick he would want the trotting horse to go for the doctor. So I stand up here with my great big Percheron and Clydesdale, and right over beside him I put a thoroughbred; and then I stand right up here beside the Percheron and put a great big, flat-backed, short-horned steer, and right over there I stand a Texas steer, and then I place a big mutton sheep, a Shropshire, and right over here I stand a mutton sheep, a Merino, all wrinkles and wool and nothing else, and then I stand a Berkshire hog here, and right over here I stand a little, insignificant Tamworth, and then I stand a bull dog here, and a hound there, and then I stand a great, big, Asiatic hen here, and over there a little White Leghorn, and all of that row represent Miserhood. Everything they eat must go in their hide and be sacrificed on the block to get your money out of them, and then your animal has gone; and everyone in this row transfers all that you can give them into energy, into motion, into power, and give back to you every day what you have given them in food, out of which they make milk and wool and red meat and eggs; and that bull dog that stands there by the Percheron horse gets under the wagon and bites the wrong fellow; and beside him we have the hound, the Scotch collie, all motion and intelligence. When you go up and down this line, it is a question: "How can I get the most to eat? And when I have eaten it I lie down and chew the cud and lay on flesh for some other day when I won't get a full meal." So I have come to believe that the thing in that running horse—speed, nerve, power—is the thing we must look for in a

dairy cow. It is the intelligence in the horse that makes him a great runner, and I believe it is the cow's intelligence and nerve and power that makes her give the milk. A draft horse does not need to know anything but "pull," and to have feet big enough so that he won't sink in the first swamp he comes to. Have you ever seen an exhibition of speed and endurance in a horse but that it was an exhibition of intelligence and brain power? So to-night I want to come before you and say that, whilst cows do not look like horses, there must be an exhibition of nerve power in the animal that is in harmony with the conformation of the running horse. I want to say one thing more: that the best milking cows on the face of the earth are allied to the Jersey form, and that is about as near a running horse as I know of; not that we expect to get speed out of a cow, but we want to get that nerve power concentrated into the milk. A shrewd man never bets on a horse that has a dull, flat, sleepy eye. A cow might give a good quantity to start with, but she will keep getting small, and will finally dry up and board with you the rest of the year. While my friend Tillson's Holsteins do not look individually like Perry Goodrich's Jerseys, yet, after all, the zoologists will stand up and tell you that the conformation of their two forms are practically just alike. I have a few pictures here which illustrate what I want to say to-night, that whenever an animal does a better thing than the average of animals, that animal, every single time, will have a specific form to do that work with. If we are to get the best out of our animals we must have the form for that purpose.

Mr. Gould then explained the characteristics of the different cows, and was listened to with rapt attention. He said that Mr. Tillson's cow, that gives 250 pounds of milk a day, must be fed enough feed to produce that milk, and, therefore, must have healthy lungs, a tremendously big heart, a good, strong liver, and a tremendously well put up gizzard, (laughter) and this cow of Mr. Tillson's has got it. All these cows, with few exceptions, have that great big strong stomach. We want a large nostril, we want that strong throat, we want that strong shoulder, and then we have got what? Got a cow that has constitutional vigor; some of these cows have not got it. Do you ever think that a whole lot of men get scared about the first of December, and think the cow must be turned out and made hardy, and then be put in a warm stable below 40 degrees so that they will eat hay. Why don't we get frightened in June and put them in cold storage for part of the day? We want less of the freezing and thawing, and better breeding.

The most serious thing to-day in the breeding of our cows is the mixing of every confounded breed on the face of the earth in one cow, and then trying to say she is a good cow. It is putting 40 influences in one cow, and asking one influence, the dairy influence, to pull the 39 other ones down. Do you know of any good breeder that mixes two breeds? Do you know any good animal that has four breeds represented, that is selling in the market to-day? And yet I go through the country and only one farmer in ten is doing any better, and nine farmers out of ten have got cows long and cows short, and cows high, and cows wide, and cows thin, and cows red, and cows white, and cows brindle, and cows green (laughter), and we are going before the country and reaping a great harvest, and reaping it with a cow that doesn't know when you feed her whether she is going to put that feed into milk or put it into beef. We have been mixing horses in the States to improve them, and we have a race of horses over there that we are selling for $16 a dozen.

A farmer said to me the other day, that he wanted a cow to give lots of milk, and to give beef, and he wanted her to give him a heifer one year that will make a milker, and the next year he wants her to give him a calf that would make a great flat backed steer. He wanted a combination cow, so that when he wants to send milk to the city, she would give milk, and when he wanted to send it to the creamery she would give cream, and when he wanted to send it to the cheese factory she would give curd, and a neighbor of mine who has a magnificent Holstein cow, said "I want a cow better than I have got. I want a cow that, if she doesn't turn out a good milker, I can sell her for a Montana steer." The results of that kind of breeding are as shown on this picture, straight lines in every way. You can keep that cow until she is six years old. Milk about six months, and she will give about 1800 pounds of milk, and then she says to you: "You bred me to give milk, and now I have given milk as long as I think necessary, and I am going to get fat;" and so she boards with you the rest of the year, and you are perfectly satisfied because you have got a cow that will get fat. And so I say: "Why didn't you sell the beef of that cow? You understand every pound of beef on that cow has cost as much to make as

every pound of butter that some other cow in the dairy business is making, and you are selling butter for twenty cents, and the same food has made four cent beef, and you cannot sell the beef without selling the cow." The Abyssinians have a good theory on that line. They milk one side of the cow and let the calf run on the other side, and when the Abyssinian gets hungry himself he throws the cow down and cuts out eighteen or twenty pounds of beefsteak, fills the hole up with blue clay, sews it up, and grows another steak. (Laughter.)

Here is a cow that stands over in the northeast corner of my barn, a splendid cow, as handsome as a picture. Gives milk a while, and then don't. I can hear one of you fellows down there saying, "Why don't you sell the cow?" My wife owns the cow. She bought her because she is handsome, and my wife feeds the hens corn all winter and buys eggs, and so that handsome cow stands there in the barn and gives me $18 or $20 worth of milk, and then she gets fat and is the pride of the family. Here is another cow over here. She is a Poland China. (Laughter). There is a cow that has been bred for generations back in Scotland, and every instinct of motherhood has been stifled in that cow, and she is a miser, and stores up everything she eats There is a cow, five years old, the mother of three calves, and every calf brought up by a wet nurse. (Laughter) No sign of motherhood about the cow beyond the fact that she is the mother of her race. A man mixes this breed into his cow, and what has he got? He has got beef making mixed in with milk producing, and the beef making is stronger. Here is another cow. Mr. Derbyshire looked at the cow down at the hotel, and said that is the cow the Canadians want. (Laughter). The only thing that I can say about her is that she is long. Other points so prominent in all those other cows are absolutely wanting in this cow. A blockhead, horns out of which they make piano keys, the eye back under a porch, an ear flapping along every time she steps, and a neck just the same thickness the one way as the other. And the steak off that cow is all in her neck. Do you think that cow will ever have the milk-fever? Will she ever give enough milk to get up a fever? And yet I stand here and say that she is the best bred cow in the whole collection. That cow represents nearly all the best dairy breeds I know of, and some other things. That kind of cow we get by mixing all the other kinds of breeds, and I want to say that when you go to any locality and find great producing cows, you will find cows bred pretty near to type. In Scotland you will go through whole sections and find the true bred Ayrshire cow, and no other cow nonsense bred into her. Here is a cow that gave 13,000 pounds of 4 per cent. milk, and yet I say she is just good for the individual, and as an individual. All her good qualities will die with her. She inherits one good thing—that is milk. She has nothing she can transmit to her offspring.

The dairyman of the 20th century will never get the cow he wants, or should possess, until he breeds cows true in line, breed by breed—that the day of cross breeds for the profitable cow has gone by never to return. And another thing is that the cow you want is the cow that is adapted to your locality, and I would warn you against trying to invent a new breed of cows. The average farmer must stop changing the head of the herd every generation. There is only one breeder in ten that can knit the families of the same breed. Families of the same breed may not harmonize any better than two families of two different breeds. Men who are breeding the best dairy cows to day and get the best success from it, are breeding back to the head of herd for three or four generations. Don't confound that with inbreeding. Mixing two or three families, but going back to the foundation head.

I bring into my herd an influence, and my first out cross is one half of what I want, and now I bring in another influence and cross that with the original that I do want, and I cut it right in two, and only get a quarter of what I want, and now I go outside again, and I have only got one sixth of what I want, and I have fifteen families represented there.

I go back to my foundation head, and my second cross is seventy-five per cent. and the third time I have got 87 per cent, and then I have got heredity.

As I stand before you to-night, I bring from the States the most kindly greetings to you. You are having some trouble of your own as well as we are, and we must mutually stand up against each other. Standing here I want to bring greetings from the dairymen of the United States. We are putting forth vigor that we have never known before, and as I stated in the beginning we do not have to go abroad for a market. Every time

we better the product we add to the price, and sell it faster, and I believe in the future we shall stand hand in hand, and we shall come a cross the border, and take each other by the hand and thank the good Lord that after all He cast our lots in good places, and made us dairymen the best fellows on the face of the earth.

ADDRESS OF WELCOME.

A hearty address of welcome was then tendered the Association by Mayor Rumball, to which the Chairman made a suitable response.

CURING CHEESE.

By T. E. Nimmo, Ripley.

This section of cheese-making is generally the most neglected, either owing to carelessness, or to lack of knowledge in the important details. It is just as essential to have cheese properly cured, as to be careful in the manufacturing process. The greatest difficulty is to know how to cure cheese under all conditions. We ought to have some idea how long cheese are to be held at the factory after they are made, then a maker may know how to handle it accordingly ; another point, we must acquaint ourselves with regard to the particular make-up of the article on the shelves, so as to know whether it ought to be cured faster or slower. One day's make of cheese may be dry and stiff, while others may show considerable moisture. I have reason to believe that the latter will cure faster than the dry cheese. During the past, this question of having well adapted curing-rooms has been neglected. However, I am pleased to notice that cheese companies and factory owners are beginning to realize the importance of improving the construction of curing rooms, so that the temperature can be controlled.

My subject has nothing to do with the construction of curing rooms, for that is a subject by itself. But we are obliged to cure the cheese all the same. Assuming we have all the necessary conditions under our control, we must consider four principal points, viz —temperature, air, moisture and light. The most important point is temperature, which should be kept even, so as not to rise and fall with the temperature outside. I have noticed that the temperature varies from the floor to the ceiling—and cheese just from the hoop may be placed on the top shelves ; then when a number of shelves are filled (say six or eight days' work), lower a few cheese each day, to the next shelf under, and so on to the bottom shelves. Then move them into a cooler room. This process will always keep the green or new cheese in the warmer temperature, and, as they advance in the curing process, they will be in the cooler temperature, or the separate room.

This manner of handling agrees with the theory that cheese ought to be placed in a temperature of 65 or 70 degrees for a short time, then gradually lower to 60 degrees, or, if obliged to hold them longer, to a still lower temperature, say in a room at 50 or 55 degrees. Spring cheese should be kept at higher temperature, as they are required to be cured faster. Fall cheese ought to be cured slowly, but great care should be taken to prevent them getting chilled, especially the October and November makes. I have been in curing rooms where no fires were kept up, and the temperature was altogether too low. The cheese were not cured enough to be placed in cool temperature. What is the result ? A tendency to be pasty and sour.

Air. Have the rooms thoroughly ventilated. If the atmosphere outside is not damp open the windows morning and evening.

Moisture. We should pay some attention to the moisture of the room. If it is damp you will have mould to contend with, which spoils the appearance of the cheese. In cold weather, when a fire is required, the room may become too dry. I would place a vessel of water on the stove, so that the steam from it will create a moisture ; or I would sprinkle the floor with a little water occasionally.

Light. Cheese may be improved by having a certain degree of light, but do not allow the sun to shine directly on the cheese, or you will soon notice a bad effect. The exposed windows should be protected by Venetian shutters. Awnings also are very good protection. I have heard of painting or frosting the window glass, which arrests the direct rays of the sun.

Now I will mention a few things we ought to do :

Thoroughly scrub out the curing-room every spring, and whitewash the walls and ceiling with fresh lime once a year.

Scrape, scour and scald the shelves often.

Sweep out every week.

Place the cheese on the shelves uniformly.

Stencil date, and number of vat on every day's make.

Turn the new cheese every morning.

Be careful not to bruise or break any corners off.

Rub mould off the cheese as much as possible.

Have your room well ventilated.

Give the cheese plenty of air and light.

Keep everything neat and clean. This puts a happy twinkle in a visitor's eye, and the buyers may not criticise.

Watch carefully the curing process.

Then you will play an important part in the drama entitled " Cheese-making."

EXPERIENCES WITH SUB-EARTH DUCTS IN 1900.

By J. N. Paget, Canboro.

I do not appear before you this morning for the purpose of giving an address, as the programme states. I am merely expected to give you my experiences during the past year with the sub-earth duct, as a means of controlling the temperature in the curing room. You will remember that a year ago, at our last convention, I had something to say on this subject, and some statements I made then I feel that I will have to take back. I think I stated then that the sub-earth duct properly constructed would control the temperature in any kind of weather, so that it would not go higher than 70 degrees. I was then speaking from the experiences I had had. I have had more experiences since then and experiences of a different character. As you know, the season through which we have passed has been a very different season from the previous one. During the season of 1899 we did not have any extremely hot weather, but during the season of 1900 we had much extremely warm weather, yet, notwithstanding the fact that I have not been able to control the temperature to the degree I mentioned last year, I think as much about the sub-earth duct, as a means of controlling the temperature in a cheese curing-room, as I did a year ago. I believe it is as good, if not the best, means we have at the present time. During the discussions at this convention you have heard a great deal about mould on the cheese in the curing-room, and the different speakers have advised the necessity of having proper ventilation. My experiments with the sub earth duct is that it is the best means of ventilation I have ever had anything to do with. It gives a circulation of good, pure air, at all times through the curing-room. During the past season I have not seen mould in my curing-room. I have talked with a great many cheese makers throughout the country, who all say that they have been troubled more than usual with moulded cheese. From the beginning of the season to the end we did not have any mould, and I attribute that entirely to the fact that there was a constant circulation of cold air passing through the curing-room.

During the whole season, except in very cool weather, I left the openings of the sub-earth duct open, so that there was a constant current passing through the room, and I was able to control the temperature during the whole season except in the first week of August and the last week of August. During the first week of August we had a continuous warm spell lasting for six days, and towards the end of that period the temperature in my curing room went up to 78 degrees for about 24 hours, then the weather moderated and it cooled down. In the last week of August it went up to about the same temperature for a few hours one night and part of one day. These are the only times during the season that the temperature was above 72 degrees.

We had some very warm weather at other times, when the ordinary temperature in the curing room was from 65 degrees to 70 degrees, usually about 65 degrees So that I believe the sub earth duct is a good system for controlling the temperature, because it

causes the least trouble, and is less expensive after the first cost of construction than any other method we have in pratice to-day. I think it is very much less trouble than ice. I have not had experience with ice, but from what I have heard there is more or less moisture with ice, which would have a tendency to create mould, but with the sub-earth duct we get a dry pure air.

It is very necessary to be careful in the construction of the sub-earth duct.

As most of you are aware, my factory was burnt down after I had the sub-earth duct in it one year. In clearing away the rubbish and dirt in it, I came in contact with the end of the sub-earth duct, and found on examination that some of the tile had crumbled. I used ordinary field tile, and I found some of this tile had crumbled. On examinating to find the cause I found there was not proper drainage from that end of the drain. Water had accumulated there, and that water had caused the tile to crumble. My drain is constructed of seven rows of 5-inch tile: two rows of this tile were closed up owing to the crumbling of the tile

I drained my sub-earth duct from the end nearest the factory. I lowered the water drain to carry off any water that might accumulate there. I lowered that a foot, and since that time I have found the air perfectly dry. It is as dry as the atmosphere outside. There is no moisture whatever. That is one thing we ought to be careful of, that there is no water lying in the sub-earth duct, for if water is allowed to accumulate in the drain it will cause a moist air coming into the curing-room.

While the sub-earth duct is all right in itself, it is not a sure means of controlling the temperature unless you have the curing room perfectly insulated.

I have a frame building. First I put 4-inch scantling, the studding, and I put on the outside common ordinary inch lumber, then on the outside of that I put felt paper, then on the out side of that I put lapped siding.

On the inside I lined the studding up with ordinary inch lumber, then I put on felt paper, then I put on inch and a half strips on the felt paper, and then inside of that I put matched and dressed lumber. And thus I have two dead air spaces in the wall.

I have the double doors and the double windows, and have both windows painted with white lead. At first I painted the outside window only, but found there was some heat coming through, I then painted both windows and found the inside window was just as cool as any part of the curing-room.

There is another advantage of having your windows painted, instead of having shutters on. You have a beautiful light in your curing-room all the time, not a strong sunlight, but a nice moderate light which is very necessary in the curing of cheese.

Of course a temperature of 78 degrees is too high, but while my curing-room went to 78 degrees on these two particular occasions, the cheese was not affected.

On the first occasion my curing room was almost full of cheese, which of course, had a tendency to make the room harder to control, because this cheese would become warm.

This lot of cheese were sold previous to the warm weather but had not been inspected. They were inspected after the weather moderated. No fault was found with the cheese from any injury done to them by the heat, so while the temperature did come up it was not of sufficiently long duration to have injured the cheese. I have been therefore, pratically able to perfectly control the temperature in my curing-room during the past year.

A MEMBER: Has Mr. Paget any new ideas regarding the channels from the sub-earth duct? You have five-inch tile?

Mr. PAGET: I have seven. I dug the drain six feet and a half deep, three feet wide at the top, and narrowed down to two and a half at the bottom. In the bottom I placed four rows of five-inch tile. Immediately on top of these rows I placed three other rows making a total of seven rows of five-inch tile, I then covered it over with earth. That is the only work there is in connection with it. I used ordinary field tile.

A MEMBER: Do you think small tile with a number of channels is better than a larger tile with fewer channels?

Mr. PAGET: I do not think so. If I were constructing another sub-earth duct I would put in larger tile and fewer of them, because I believe the greater number of tile you have the more friction there is to the air. If you can make your drain long enough one ten inch tile would answer. I believe it would be better to have the drain a little longer with smaller tile. My drain is 150 feet long. It would be better to have had it 200

feet long. I have had a thermometer hanging at the bottom in the floor where the air comes into the curing-room, and when the thermometer was 96 degrees outside, the air coming in at the floor did not go above 64, and was usually only 58 degrees. There is another point I wish to refer to. There is sometimes trouble to get the air out of the drain. If we had some means by which we could draw the cold air out it would be better. The drain will cool the air, but the trouble is, that unless there is a current of air outside, the cool air remains in the drain. I believe the less friction you have in the drain to interfere with the current of air the better it will be. I believe the drain Professor Dean has has six rows of six-inch tile. I have heard of another man who used one drain of ten inch tile with very good results.

A MEMBER: Can you give us the approximate expense of building a drain?

Mr. PAGET: About $75 or $80.

The CHAIRMAN: Would there be an objection to making the drain of cedar plank?

Mr. PAGET: I think tile is more durable, and field tile is not very expensive.

Mr. P. BROWN: A wooden drain would not cool the air as well as tile?

Mr. PAGET: I suppose the tile is smoother, and the air would pass more easily.

A MEMBER: Would not a ventilator flue at or near the place where the air comes into the factory be of advantage?

Mr. PAGET: I was advised by Professor Dean to have the opening in one end of the curing-room and the outlet at the other end, so as to create a current across the room. In a very calm day the air will not pass through. During the past season there was not a period of 30 hours that there was not sufficient current of air moving outside to cause the air to pass through the room; but there are times, particularly early in the morning, when the air is quiet outside, then you will not notice a current of air passing through. Professor Dean suggested a fan attached to the engine. The cool air is in the drain. The air in my drain seldom went higher than 58. If we can get that cool air into the curing-room there will be no trouble.

A MEMBER: What is the size of your ventilator—the outlet?

Mr. PAGET: About 20 inches.

A MEMBER: Do you think that is sufficient?

Mr. PAGET: I think it ought to be.

A MEMBER: A square one?

Mr. PAGET: Yes.

A MEMBER: What length is your intake pipe?

Mr. PAGET: Forty feet. I have a well or cistern at the intake end of the drain, of brick, and I have my tile running into that well at the bottom. Then I have on the top of that well a wooden frame 3 feet wide at the base, and tapering up, 20 inches at the top. That wooden pipe is about 26 or 28 feet high. Then I have on top of that a galvanized iron cowl, sufficiently high to make it about 40 feet all the way, and the cowl works on a pivot, so that it is always open to the wind. The mouth of the cowl is 3½ ft. The larger you can get the opening the greater will be the current of air. The cowl I used two years ago I did not use last year. It was only 20 inches across. That cowl should be made perfectly true so that the slightest breeze will turn it. Some men have told me that they have trouble with their cowls, that they will not turn.

A MEMBER: I think the cowl should be made funnel shape?

Prof. DEAN: If you have a proper ventilator, so as to create an upward draft, it will draw the cool air out of the duct. We got one of these ventilators that are advertised and put it in our curing-room. We gave it a thorough test and found it did not help the cool air into the curing-room. We have yet to find some way of drawing the cool air out of the duct. I am inclined to think that some sort of a fan would be necessary to start the draft. There are some days during the season when there is no perceptible draft of air coming into the room, and that in my opinion is one of the weakest points of the sub-earth duct.

A MEMBER: Would not the relative position of the inlet and outlet ventilator have something to do with the circulation?

Prof. DEAN: In our factory the room is divided into three rooms. The outlet from two of these rooms was made about ten feet higher than the intake pipe. So far as we can discern there was no difference in the draft where the outlet was 5 feet higher than the inlet. From a study of the question I am satisfied that the coming of the cool air

into the curing-room depends nearly altogether on the movement of the air outside. When the air is not in motion outside there is no draught into the curing-room. We put on a much larger ventilator than the one we had in our room. When you get a large ventilator filled with air it takes a stronger draught outside to get the air in motion. From my experiences the small outlet is preferable to the large outlet.

The CHAIRMAN: How much would you recommend?

Prof. DEAN: I would say that it is not necessary to have it over a foot square.

A MEMBER: I think it would be helpful to have a reversed cowl. On the steamers crossing the ocean they have ventilators that way, and the ventilator faces one way and the outlet another. This is very helpful, especially in the very hot latitudes.

A MEMBER: Would not a large lamp placed at the outlet have an effect in drawing the air out of the curing room? It would heat the air and cause more of a draft.

Prof. DEAN: I have heard of that being done, but I do not think any of those things are much good. As far as I have observed it depends largely on the motion of the air outside. We have the outlet from one of our rooms made of galvanized iron, and higher than the intake pipe, and the other is lower than the outlet, only one foot and a half above the roof, but there is no difference in the draft of these two rooms as far as I can see.

Mr. TILLSON: I have had an experience of over thirty years with these cold air ducts. I put in one over thirty years ago to ventilate my creamery. I put it in with twelve inch sewer pipe and cemented the joints, ran it back about one hundred and fifty feet, six feet in the ground, and had a stand pipe of galvanized iron with a large cowl on top, just the same as you have here, but in order to get a better draft the outlet is in the chimney stack from the boiler which is about seventy feet high. That being always warm creates a strong draft up the chimney much stronger than it would if it was not warm, so that there is always a very strong current of air passing right through. The chimney stack is on the opposite end from where the cold air comes in, so the draft goes right through the room. No matter whether there is wind or not there is always a draft, and it works very fine. I have the same principle for ventilating my cow stable. The cold air duct is a twenty-four inch sewer pipe. The stand pipe is about twenty-five or thirty feet high, and a little larger still. That works very fine indeed, goes right through the stable, and takes the air out all along in front of the cows, and I have quite a number of high chimneys to take it out. That does not give quite so much draft because the other chimney is always hot. Sometimes the cold air will come down the chimneys instead of going up.

Mr. PAGET: You said that you had a high chimney on your creamery, and that those on the stable are not so high.

Mr. TILLSON: The one on the creamery is higher in order to get a draft for the boiler. My object in having these was to get the air from as far away from the creamery as possible so as to get pure air. That is why I came to put it in. I never read or heard of anything of the kind before. I think I can get pure air by keeping the windows and doors tight. That was the idea, and it works very fine.

Mr. PAGET: Don't you think the height of your chimney at the creamery has a good deal to do with your getting pure air?

Mr. TILLSON: Yes, and if I had a chimney as high as the stables it would be a great improvement.

Prof. DEAN: I think Mr. Tillson's idea is a very good one. The idea of connecting the outlet of the sub-earth duct with the chimney or smoke stack is worth a trial, and it is possible that the heating of the air as it passed out through the chimney stack creates a draft. It would be worth while trying.

I think we shall try that in connection with our own sub-earth duct. It would not be difficult to connect the curing-room with the chimney so as to get this draft.

A MEMBER: It would not interfere with your draft if you connected the tile to the smoke stack by a horizontal pipe.

Prof. DEAN: I do not think it would.

A MEMBER: I would ask Mr. Paget what his floor is made of in the curing-room?

Mr. PAGET: A wooden floor.

Mr. A. T. BELL: In constructing the wall in your curing-room did you use double felt paper or single?

Mr. PAGET: I used single, but I think probably the double would have been better. I have heard of some using asbestos instead of felt paper.

A MEMBER: Is there a circulation under the floor of your factory?

Mr. PAGET: Yes. There is an opening underneath the floor under part of the curing-room, but if I am alive until spring I will close that up. I think that has something to do with making the room a little warmer. I believe if I had a stone wall extending all the way around the curing room it would have better results.

A MEMBER: How do you arrange the elbows in the drain?

Mr. PAGET: I did not make any elbows at all. Where I turned it into the factory I took a tile and cut off a piece of the tile so as to fit. Perhaps if there were elbows it would be better.

Prof. DEAN: We put a curve at each end of the sub-earth duct; and had the curve come up to the upper end of the ground. At the end, under the curing-room, this curve comes up to the floor. We use no elbow, although at some of the factories they use elbows. At the Lyons factory they put in two ten-inch tile with elbows. Perhaps that is the best way to connect the duct with your room if you can get the elbows.

SOME NOTES ON CHEESE-MAKING.

Mr. J. A. RUDDICK, Assistant Dairy Commissioner, Ottawa, gave an address on the above subject, a report of which appears in the proceedings of the Eastern Association.

DAIRYING IN NEW ZEALAND.

By J. A. RUDDICK, ASSISTANT DAIRY COMMISSIONER, OTTAWA.

I have been asked to say something about my New Zealand experience, and I shall be glad if I can give you any information which will be of interest to you about that country. I suppose there is no part of the British Empire that attracts as much attention for its size as that part lying away down under the Southern Cross. You have all heard a great deal about New Zealand, and you get a good deal of information that is very misleading. Of course, in the short time I was there it was impossible for me to learn very much about the country, except in a general way, and I shall only attempt to deal with it in a general way. Those of you who have not forgotten your geography will remember that New Zealand lies between latitudes 34 and 46 south. The area is about 104,471 square miles, about one-sixth less than the area of Great Britain and Ireland. A great deal may be said about the physical features of the country. I suppose the most of you are aware that the greater part of it is very hilly, much of it very mountainous. The highest peaks reach something over 12,000 feet, many of which are covered with perpetual snow. A great part of the country, even the hilly part, is covered with a very dense bush. New Zealand bush is something different from anything in any other part of the world. It has this peculiarity, that there is no tree or shrub growing there that is found in any other part of the world's surface, with one or two exceptions. There is what is known as the cabbage-tree, which grows in Australia and some other lands, but with the exception of the cabbage-tree and some of the ferns, the flora of New Zealand is entirely different from anything else in the world. The most striking thing to a person from this country is that all the trees are evergreen. The leaves never fall off. There are no deciduous trees in the country except those imported by the whites since they settled there. The nearest approach they have to anything we have is the birch tree. Yet it is an evergreen tree, and the leaves remain on the whole year. In the northern part of the country, where the climate is warmer, there is growth the whole year round.

The climate of the country has attracted a good deal of attention, because it is never very cold and never very warm. In Wellington, which is about the centre of the island, the lowest temperature recorded last year was 31, and the highest temperature was 76. These extremes vary a little in the north and south. It is only 180 miles wide at the widest point, and the winds sweep right over the island from either direction, so that the climate is very much tempered by the surrounding ocean.

The population consists of 250,000 whites, and 30,000 Maoris, or natives. These Maoris are probably one of the most interesting native races on the face of the earth. They are people who, a little over 30 years ago, by their very marvellous skill and strategy in war, caused the British soldier one of the hardest times he ever had, and yet to-day they are clamoring to go to South Africa to fight for their beloved Queen Victoria. They were so eager to go that when their services were refused they contributed very largely in money, and supplied horses The Maoris supplied $10,000 to the patriotic fund. They do not take to work very kindly, but they are progressive. A great many of them are not compelled to work. The rents from the lands which they own make some of them quite wealthy, and they live in comfort. They have great powers of mimicry, and they are adopting the white customs very rapidly, and some of them become very good citizens. There are four full-blooded Maoris in the House of Representatives, and one half-caste Maori is a Minister of the Crown representing a white constituency. These people conduct themselves quite on parallel with the whites, and there are no more eloquent or better speakers in the House of Representatives than the Maoris.

Agriculture in New Zealand is divided into three main classes. They do very little mixed farming. A man there is a sheep farmer, or a grain grower, or a dairyman. We have a sheep farmer and grain grower and the dairy farmer. The pastoral interests are the most important in the country. It certainly is a very fine life, and is, I think, one of the things that has attracted the people to New Zealand. This life on the sheep station is almost an ideal one, and any of you that have the fortune to go there and be entertained on these large estates will certainly have something to remember. You can understand the importance of the sheep farm industry when I tell you there are over 19,000,000 sheep in the colony, and that the exports of wool for the year were over $20,000,000, besides which they exported during the same period 3,339,153 carcases of frozen mutton and lamb. As regards grain growing, they are not growing much for export, only a small surplus of wheat and a little oats and peas. The grain is grown largely to supply local demand.

As regards dairying, during the year ending the 31st of March, 1900, the export of butter amounted to 17,889,272 pounds, valued at about $3,280 000. The quantity of cheese exported was $10,723,550 pounds, valued at about $997,000 I think this is just about equal to the quantity of cheese produced in the county of Oxford, so you see they are not very serious competitors with Canada as regards the quantity which they make. I do not think the output of the cheese is very likely to increase to any great extent. The probabilities are that during this present year they will not have as much to export as they did last year, which was the highest they had ever exported during any one year. The increase since 1895 has only amounted to 25,000 boxes of cheese. The reason for that is that it is not profitable in that country to run small factories, and the tendency is to go into the butter-making by establishing large central creameries. The production of butter will continue to increase for many years to come, and it is likely New Zealand will be a pretty large source of supply for butter in the near future. Most of this butter is made in the factories, although there are a great many large dairies where they milk from 300 to 400 cows on the one farm and make the butter there, and this is classed as creamery butter. Any farmer who has over 50 cows may have his dairy registered as a creamery, and all butter which is made on farms where there is more than 50 cows is called creamery butter.

In New Zealand they have a law which compels every factory owner and every private dairyman to register his premises. He is supplied with a certain form of stencil properly designating the butter he manufactures, and it is unlawful to use anything else. There are about 70 cheese factories in the colonies, and about 120 butter factories, and these butter factories have over 200 skimming stations, and then there are 20 factories which make both butter and cheese The factories are large, and the new ones are well constructed and well equipped, and they average rather better than the general run of Canadian factories.

A good cheese factory there usually costs about $10,000, and the butter factories cost all the way up to $25,000, and some as high as $100,000. The best butter making concern, which is in the city of Dunedin, has from 25 or 28 skimming stations. Their central premises cost them over $60,000, and there are no frills on it—a good, plain, business looking place. All this money has been paid out of the profits of the concern. Their

capital stock is only $16,000 and that does not any more than cover the outside business. They almost universally use cement floors in their factories, and from this time forward I am an advocate of cement floors in cheese factories and butter factories. I have seen cement floors in this country, but the difficulty seems to be to get them made properly. There are cement floors and cement floors. If a cement floor is properly made, while it is not so nice to work on, it is much more sanitary, more durable, and more economic in the end, and there is no comparison between a properly made cement floor and a wooden floor. These floors are constructed with a foundation, the foundation and floor is all in one piece, and the foundation comes up above the floor 18 inches or two feet. The wooden walls are put on top of that, and, in washing or cleaning, the bottom of the wall never becomes wet, and it will last much longer. They have paid a good deal more attention to the drains that we have. They have their factories well drained, and their drains are constructed as a part of the floor and foundation, and they have a much better way of getting rid of all the slop around the factory. Of course there are many unsightly, unsanitary, badly constructed factories still in the country—old buildings. I have been more than ever impressed with the importance of large factories, and believe that the curse of the dairy business of this country is the small factory. You are not so badly off here in Western Ontario as we are in Quebec and in the eastern parts of Ontario. Small factories necessitate the employment of men at low wages, which is a serious question for the future of the dairy business of this country. In New Zealand, where they have these large factories, the men are paid good living wages, and you never hear of them advertising and calling for tenders. They find the man they want and pay him enough money to keep him, and if they have a good season like last season, many of the employers give their employees a bonus at the end of the year. (Tremendous applause) I know one factory that employs probably 40 hands, and they paid all hands 3 per cent. of a bonus. One man got a bonus of £20 because he had done good work. One of these large factories could save that amount in a very short time by careful management.

A very superior class of men are engaged in the work, and are sticking to it as a life business because it pays to do so.

Then these large factories are well conducted. They have good business methods, and it seems to me that we might learn something from them in that respect.

Now I have the balance sheet of the largest cheese factory in New Zealand. They have a great deal of law in that country.

They have some very good laws, and one of them relates to Joint Stock Companies and cheese factories and butter factories come under the general law. Every Company must have a registered office, and any person has a right to go into that office, and demand a copy of their last balance sheet at any time. If they do not produce it, they are liable to be fined. They must have this balance sheet printed and distributed among the shareholders two weeks before the annual meeting comes on. I do not want any of my Canadian friends to get carried away with the idea that it would be a good place to go to better their position. I would not recommend any man to go to New Zealand with the idea that he would be able to pick up some of these large factories at a higher salary, because you will find it is very difficult matter to get an opening. There are only seventy factories, and the numbers are rather diminishing than increasing, and there are plenty of men who are able to retain their positions. There are absolutely no openings for new makers coming into the country. I do not believe Canadians should look beyond the borders of their own country for a better country. I have nothing to say against New Zealand but I believe Canadians are almost sure to be disappointed in many ways.

As regards the production of milk, the conditions in which the milk is produced are very different from what we have in this country. There is no mixed farming, so that the men who are engaged in the production of milk do nothing else. They do nothing but milk cows and take the milk to the factory. The great dairy district of Taranaki is surrounded by the marvellous mountain Agmont, that rises to over eight thousand feet in height, the top of which is always covered with snow. It is one of the most remarkable mountains in the world. It forms a great water-shed, and has streams running in all directions from its snow-capped top. The base of this mountain is a great dairy district. In that country the dairy farmers never turn a furrow on their land. They have a fence around it and a little house, and a horse and cart to draw milk to the factory. They spend about ten hours a day milking the cows, get up in the morning about half past

three or four and milk till nine, and then start again about half past two or three and milk till dark. They have no regularity about the matter. The cow milked last in the morning is sometimes milked first in the evening. They pasture the year round winter and summer. A few of them, in parts that are a little colder, and where the grass does not grow as well, cut grass and stack it and make ensilage of it, but in this particular district it is so wet that it is almost impossible to grow hay. It rains about two hundred and fifty days in the year, and the annual rainfall is one hundred and fifty inches. Under these conditions I have told you of, the cows running out all the time and no stables, the yards get into an awful condition during the winter months, and the cows are simply swimming in muck and mud in these yards, and for that reason dairy farming is not looked upon with much favor. There is no idea of permanency with them. They work until they get a little ahead, and then go into some other work, so that it is difficult to get good milkers. That does not apply so much in the southern portion where it is colder, and the cows are sheltered a little more in the winter time. I am speaking now of the principal dairy district, Taranaki. You would be surprised possibly at the cost of land upon which this milk is produced. Lots of this land is nothing but a sea of stumps and logs, because it is only about ten years since the bush was cut down, and yet that land without any buildings except a little cabin, is worth about as much as fifteen or twenty pounds an acre, and land all over New Zealand that is worth anything is very expensive. I have seen farm land without buildings sold for thirty pounds an acre, so that taking it all around I do not think that the Canadian farmer, or Canadian cheese-maker, has any reason to envy his fellow-subjects in that far-off portion of the British Empire under the Southern Cross. There are many more things that I might say about this country, but I know there are other matters to come up, and I shall not detain you any more. (Applause).

BACTERIOLOGY IN ITS RELATIONSHIP TO CLEANLINESS IN BUTTER AND CHEESE MAKING.

By W. T. Connell, M.D., Professor of Pathology, Queen's University, Kingston.

(This address is given in the report of Eastern Dairymen's Association.)

Hon. T. Ballantyne: We are troubled in this western section with a flavor that develops into onion or garlic flavor. We never find it in cheese before it is shipped. We have heard more or less of it for a long time. The first that came under my notice was from Belmont factory. The inspector reported this flavor in the cheese. We shipped to London here, and I came over to see them, and spent some hours testing them. The late Mr. Caswell bought them, and had the greatest difficulty in getting rid of them. I have had a great many complaints from the Ingersoll district, and from around London. They have also had the same trouble in certain dairies in Scotland. I have come to the conclusion that it comes from cows drinking sewage. In one place where they had the difficulty in Scotland they found the cow had been drinking sewage. The cows were shut up so they could not get it, since which they have had no more trouble from it. The cheese are simply unsaleable. If a grocer gets one of them the odor is so offensive that he has to ventilate his shop before a customer will come into it. For a number of years I have been buying West Nissouri cheese. They were usually very fine. Mr. Hopkins, one of the most careful and conscientious makers I ever knew, had charge of it. I was in England, and a gentleman who got one of these cheese said they were troubled with this flavor. I said it could not be the West Nissouri cheese. I went through and bored every cheese, and there was probably one hundred of them showing that garlic flavor. There is nothing so bad. I have a letter in my possession now that speaks of 15 shillings per cwt. loss, and they don't know what to do with the cheese. One that Mr. Caswell got he sent to Yorkshire. He thought Yorkshire men might be able to eat them. That is the most serious flavor we have to-day. I saw cheese in England last year that had been made a year, that had never been in cold storage, and yet were simply perfect. If you can produce such cheese you cannot supply the demand.

Now, you remember the weather that we had in the last half of July was perfect, but we had intensely hot weather in August. In two factories out of five they had ice, and in those two factories they controlled the temperature, and they informed me it never got above seventy. They kept in mostly at about sixty-five. The cheese in these two factories were very fine and they continued fine, but they did not take the whey back in the cans. The cheese from the other three factories were out of condition, and, at the time I refer to, sold for four or five shillings less than the other two factories, and the reason was that they were not kept at a proper temperature while curing.

A MEMBER: I think this matter of returning whey in the cans, and all these bad flavors, should be threshed out, but I do not think there are many producers here, so I think the best place to ventilate this subject would be at the annual meeting of the factory. If you could send a representative to these meetings, that would be the best place to do it; very few patrons hear anything about these things.

Hon. T. BALLANTYNE: I entirely agree with you. I have always been of that opinion, and possibly I have done as much of that kind of work as anybody—probably more than all put together. I have spent the best part of my days in trying to do that, and so very much were we impressed with the importance of that kind of work that when I was President of your Association I urged very strongly that that should be done, and it was thought to get an officer who would be able to visit the factories. You have to get a man of character, of good standing and intelligence; a man that the people will believe in and respect. I have managed a factory for thirty-four years, and never had a hitch or misunderstanding, or angry word. My patrons did not want their whey back in their cans. I have a letter in my pocket complaining of the quality of the Western cheese. I see The Globe reported me as saying "Canadian cheese." I meant Western cheese. The same letter says: "We have never seen finer Canadian Black Creeks," and "it is almost the only shipment we did not lose on. So you see what quality means." Now, I can agree with the last speaker, and I have been so impressed with that fact, that I used to spend my time doing nothing else than going from Dan to Beersheba, and I was so afraid that the people might think I had some motive. Although the factories were willing to pay my expenses, I never received anything for travelling expenses except one season when Jack Hickson, of Seaforth, gave my wife a new dress. (Laughter.)

Dr. CONNELL: I have never came in contact with that onion flavor.

The CHAIRMAN: I have heard it stated that impure water causes it. I heard one gentleman go so far as to say that the green matter you see on the top of impure and stagnant water has been discovered in the milk.

Dr. CONNELL: If you get that green matter in the milk, it must have been on the udder, and dropped in there, it could not get there any other way.

A MEMBER: I have seen farmers milking and there was no flavor when the milk was taken in, but when the acid began to form, the onion flavor developed, and that man's cows were drinking out of a place where ducks and geese made their home.

Dr. CONNELL: Where were the cans and utensils washed?

A MEMBER: At the door of the house.

Dr. CONNELL: Where the cows wade through this stuff it is very hard to keep it from getting into the milk.

A MEMBER: Then we are to understand that a cow acts as a filterer, and makes impure water pure?

Dr. CONNELL: No. I would not advise you to let your cows drink impure water, because a cow cannot be as good a cow as it should be, if she has impure water, any more than a man can drink impure water, and have no bad effects from it; but I say that it cannot get through the cow into the milk. I say impure water should not be used under any circumstances.

Mr. RUDDICK: I should like to say that no cheese factory in New Zealand sends whey back in the can, and that every single cheese factory and butter factory pays for milk accordingly to test, so you see they are miles ahead of all in this thing. During the time I was in New Zealand I was in close touch with creamery factories, and I never once heard of a proposal to do away with the test system. Of course there was sometimes friction, but the principle was accepted, and there was no question of their doing differently. I would like you to remember that sixty years ago New Zealand was an unbroken, unknown land. Settlement began there about 1841. There was a small settle-

ment to the north, principally whalers, but Queen Victoria was on her throne three years before the Colonial Office recognized New Zealand as part of the Colonial Empire, and the dairy business has grown up in the last few years.

Mr. BALLANTYNE: It is refreshing to hear him tell you they do not take back whey, (applause) and that they all pay by test. It is just as necessary to pay by test for cheese as it is to pay by test for butter.

A MEMBER: Do the cheese buyers know when the whey is returned?

Mr. BALLANTYNE: Yes.

A MEMBER: And yet you pay the same price for cheese?

Mr. BALLANTYNE: I have in my mind a factory where they no not return whey, where they have sold their produce at a higher price, when other factories would be glad to get 9 1-2.

A MEMBER: I think the cheese buyers more than anyone else, encourage the farmer to get whey back, by giving equal prices all round, and sometimes a better price to the factory where whey is returned.

Mr. BALLANTYNE: That sometimes occurs.

A MEMBER: Yes; it occurs very often.

HOW TO FEED AND CARE FOR DAIRY STOCK FOR GREATEST PROFIT

By C. P. GOODRICH, WISCONSIN, U.S.

BRING UP THE CALF RIGHT. If we are to get the greatest possible profit out of a dairy cow she must be brought up right. She must be fed right from the start. One must have a clear and definite idea of what one wants and work to that end from the beginning. What is wanted, is a cow capable of consuming, digesting, and turning into milk large quantities of good milk-producing food. We do not want the cow to turn her food into flesh and body-fat, only just enough to keep up her strength and health.

MUST NOT FATTEN THE CALF To get such a cow the calf must not be fed on food that is too fattening. The calf should be fed its mother's whole milk for a week, then substitute skim milk for a part of her feed, gradually increasing the proportion of skim-milk; in about two weeks, the milk may be all skimmed. When the change is made to skim-milk it is best to add a little oil meal gruel, or flax-seed jelly. A tablespoonful of oil-meal a day is enough at first, but it may be gradually increased to two tablespoonfuls.

The oil-meal is prepared by dissolving it in hot water and then mixing it with the milk. The flax-seed jelly is made by boiling the seed. This can be mixed with the milk Not more than half as much flax seed should be fed as oil-meal.

MILK FED WARM AND SWEET. The milk should always, especially when the calf is young, be fed warm and sweet, and warmed to blood heat. It is better to feed three times a day when the calf is young. The quantity of milk to feed the calf will vary greatly. Judgment must be used, but be sure not to feed too much. Do not feed more because the milk is skimmed. It will do to feed 10 to 12, or even 15 pounds a day when young, and this can be increased somewhat as she grows older.

MUST BE INDUCED TO EAT COARSE FODDER. The calf should be induced, as soon as possible, to eat hay and oats. Some nice early cut clover hay should be put before it. Oats may be put in its mouth, or on the end of its wet nose, when it will lap out its tongue and get some of the oats in its mouth.

I keep up this kind of feed till the calf is six or eight months old. This kind of feed will make it grow rapidly—build up its frame and muscles—but will not make a dairy bred calf fat. If it has been induced to eat all the coarse fodder possible by having it of the best quality and of the most palatable kinds, furnished in variety, the calf will develop a large stomach and a great capacity for handling and digesting food.

FALL CALVES BEST. I prefer calves dropped in the fall; for, after the milk and other winter feed is taken from them and they are put on good pasture, they will keep right on growing. The next winter they should be fed on a good muscle-forming ration, like clover hay with a little bran or a few oats, with corn-fodder and straw for a variety.

If a heifer calf—I care not how well-bred in dairy lines she may be—is allowed to run with her mother and have an abundant supply of whole milk till she is six months old, she will be permanently injured for a dairy cow. If in addition to this, she should

be fed fattening foods, like timothy hay and corn, and kept very fat up to the time of becoming a cow, and you then ask her to give you a good lot of milk she will, as Prof. I. P. Roberts says, say to you, "I cannot; you taught me to make tallow."

I lay great stress on this point of bringing up the heifer right, and keeping her from forming the beef habit. I have seen too many heifers, that ought to have turned out superior cows, make very ordinary ones from this cause. They would give a good mess of milk for a short time, then the flow would fall off, and, if good feeding was resorted to to keep it up, the beef habit would assert itself and meat would be made instead of milk.

When Should Have First Calf. The heifer should commence the first business of her life, that is giving milk, at about two years of age. After coming in she should be fed but little grain or concentrated food for a few days. Good hay, and a little bran at first, is enough. The grain feed can be gradually increased till in three or four weeks she is on full feed.

Feed to Full Capacity. Now she should be fed to her full capacity. By that I mean all the food she can consume, digest, and turn into milk. It takes a certain amount of food to sustain life. This we call the food of support, which is from one-half to two-thirds of "full feed." The only part of food we get any return from is what is fed in excess of the food of support. If only the food of support is given the cow, she can only live, and give no milk without taking it from her carcass. This she cannot do except for a short time, so in feeding that way we simply throw away the feed we do give.

Short Feeding Makes Dear Butter. Let us suppose that the food of support of a certain cow would cost six cents a day; and suppose this cow would consume and make good use of ten cents worth of the same kinds of food per day, and on this she would produce one pound of butter. We would have six cents food of support and four cents food of production, making ten cents as the food cost of a pound of butter.

Then suppose we attempt to economize by cutting down the feed to eight cents per day. We would have six cents of food of support, and two cents of food of production, which could produce only one-half pound of butter per day, making the food cost of a pound of butter two day's feed or 16 cents.

Suppose we should try still further to economize in feeding this cow and feed only seven cents worth of feed a day. Then we would have six cents food of support, and one cent food of production which could produce only one-fourth pound of butter; or it would take four days at seven cents a day or twenty-eight cents in feed to produce a pound of butter.

The poorer we feed the greater will be the cost of a quart of milk, or a pound of butter, or a pound of cheese.

Don't Feed too Much Grain. Although I advocate feeding to full capacity on the score of economy and profit in production, yet I do not advise feeding all the grain or concentrated food the cow will eat to the exclusion of some of the coarse fodder she ought to eat, especially when, as is usually the case, the same food elements cost less in the form of coarse fodder than in concentrates.

Besides this, a cow is equipped with a stomach and digestive organs made for handling coarse fodder, and we have brought up our heifer in such a way as to develop her capacity for handling it, therefore a large proportion of her daily ration must be coarse fodder, or she cannot be in good health.

Some Grain Necessary. On the other hand, a good dairy cow cannot eat enough of bulky fodder to do her best, and therefore must have some grain or concentrated food. But the question is: What proportion of her food should be concentrated?

My rule is that about one third, and never more than one-half, of the entire weight of her daily food should be concentrated. This is only a general rule which needs to be modified to suit each individual cow.

I feed grain food somewhat in proportion to the quantity of milk or butter a cow can be made to produce. Those that can be made to produce the most should get the most grain, and those that do not respond to the grain food well in milk, but go to laying on flesh, should have less.

Watch the Cows. The feeder must watch his cows, and see what they do with their food; watch to see that they eat it up clean with a good appetite; watch to see that it is well digested; watch to see what is done with it; whether it goes to the milk pail or on to the cow's back.

No more food should be given a cow than she will eat up at the time. Have none left over in the manger to be mussed over and breathed on. They will eat more, and do better, if they are fed in this way.

Balanced Rations. Cows should be fed a properly balanced ration. Experience has demonstrated that the proportion of digestible protein and carbo-hydrates should be about as one to five and a half or six. The chemist tells the amount of the different elements in the food, and tells us what in his opinion a cow ought to produce with it, but the cow must be consulted before the final verdict can be rendered. The food must be palatable to her or she will not eat it. It must be easily digested or she cannot use it. It must be healthful for her or it will make her sick.

All Cows Should Not Be fed Alike. All cows do not want to be fed alike. Cows that are inclined to put on fat should be fed less of the carbo hydrates such as is contained in corn; and more protein food, like gluten feed, oil-meal, buckwheat, middlings, etc; while those that are inclined to milk down too thin should be fed more corn or other carbonaceous food.

Feed a Variety. The feeder should study to give cows as great a variety of food as possible. They love a variety as well as we do, and, if allowed freedom to get a variety, will have it, and do much better than if confined to one or two kinds of feed, no matter how good those foods may be

Succulent Food Green succulent food is better for milk production than the same kind of food cut and dried, no matter how carefully cured. We should always provide some good soiling crop for time of summer drouth, so that cows should never be without good succulent food in summer. In winter they do much better if fed succulent food. We cannot have grass, nor green corn fodder, but we can have the next thing to it, we can have silage. The cost of producing milk can be greatly reduced by means of the silo. It reduces the cost of feed and increases the flow of milk above what can be obtained by feeding all dry feed. The cheapest and best way to provide summer feed to help out dry pastures is by having a summer silo. Succulent food may also be provided for winter by raising roots, but they require more labor than silage does, to provide the same amount of food value

Regularity in Feeding is of Great Importance Cows should be fed as nearly as possible at the same time each day, then they will not be worried waiting for their feed.

How Many Times a Day to Feed. Many good dairymen advocate feeding but twice a day, while others insist that it is better to feed three times. I have always been in the habit of feeding three times a day, with coarse fodder, and twice a day with grain. Perhaps they would do just as well to leave out their noon feed of fodder, and give more night and morning, after they got used to it, but I am sure they would not at first, and I have never had the heart to disappoint them by not giving them their noon feed. I think this having feed three times, or only twice a day, is a matter of habit with cows, the same as it is with men.

Care of Cows. The most important thing in the care of cows is to see that they are comfortable. They cannot do well unless they have comfort. Do not have them lie on a bare plank floor, or, worse still, on a bare cement floor. Give them a good, clean, evenly made up straw bed, then they can lie down in comfort, and will lie down and chew the cud most of the time; standing up only long enough to eat and be milked.

The temperature of the stable should be comfortable, never getting below freezing. At the same time, the ventilation should be such that the air should be pure and healthful.

Water and Salt for Cows. Cows should have water at least twice a day, and that at a temperature that suits them, which is surely not ice water, but 20 or 30 degrees above. They should have free access to salt, or it should be given them every day from one to two ounces per cow.

Cows Should Not Be Exposed to Cold or Storms. Cows should never be out of doors when the weather is uncomfortable. They may be turned out in a yard well sheltered from the wind on pleasant, sunshiny winter days for two or three hours, but when the weather is very cold, or stormy, if they are not watered in the stable, which is the best way, they should be out only just long enough to drink from a tank a few feet away from the barn, and then immediately allowed to go back. It is cruel, as well as unprofitable to let cows stay out in the pasture during a cold October rain. One day's exposure to such weather will cause the owner serious loss by the shrinking of the milk.

If a cow is made to shrink in milk from such a cause she can never be brought back to the quantity she would have given if the shrinkage had not occurred.

Excitement. Avoid getting cows excited. Driving cows with a dog is a very expensive business. A boy mounted on a horse does not always drive cows as gently as he should. Any excitement of any kind, whether it be from a dog or a boy chasing them; blows and rough treatment; loud and angry talk in the stable where they are, will cause the flow of milk to decrease, and it nearly always lessens the per cent. of butter fat in the milk they do give. I have known two cows to have a hard-fought battle in the yard where all the cows were, and not only the combatants, but nearly all the rest of the cows shrunk considerably in milk in consequence of the excitement. Be gentle and kind to cows always; they will pay you for it in good milk.

Milking. The milking should be done in such a way as to please the cow by not causing her pain, and yet get the milk as quickly as possible. Get all the milk, but do not keep on stripping after you have got it.

Some persons will go on and tell you just how to do it—how to take hold of the teats, which to milk first, and so on. But I think no rule can be given that will apply to every cow. The milker must find out by practice just how to accomplish the desired object with each cow, and when he has found out the best way, milk her the same way every time.

It is best not to change milkers, but have the same person milk the same cow every time. Milk in the same order every time. When you have been in the habit of beginning at one end of a row of cows and taking them by course right along through, you will notice that when you have about done with one cow, the milk will begin to drop from the next one to her. She is ready to be milked; she expects to be milked; she wants to be milked, and then is the time to milk her. But if, instead, you should go to the other end of the line and get around to her half an hour later, her milk will not "come down" as readily as it would if taken at the right time, there would not be as much of it, and, if tested, it will be found to be poorer in butter fat.

How Long to Go Dry. As a rule, it is best to have cows go dry six to eight weeks, but there are some persistent milkers that it is difficult to dry up at the proper time. If a cow cannot be dried up at least three or four weeks before coming fresh it is better to continue milking right along. If you succeed in drying her only a week or two before coming in, the chances are that she will give very little milk when she does come in, and perhaps fail entirely in milk. But the cases are very rare indeed, where by the exercise of proper skill a cow cannot be well dried up four to six weeks before coming in.

How to Manage With First Calf. To manage a heifer of a highly-organized dairy temperament, when she comes in with her first calf, in such a way as to make her as good a cow as she is capable of being, requires tact and skill of a high order.

After years of experience, and trying various ways, I have come to the conclusion that all things considered, the quicker the calf is taken from the heifer the better for all parties concerned. If the calf is allowed to suck several days the cow becomes much more attached to it, and will mourn more, and be more likely to withhold her milk than if they were separated at first.

To succeed the best, the milker must in some measure take the place of the calf in the affections of the cow. It requires extreme gentleness and kindness and much petting on the part of the milker to accomplish this. Some, men especially, are failures in this respect, and consequently can never be good milkers. Certain it is, no cow that has nervous energy enough to be worth anything for the dairy, will do her best in giving milk if she hates her milker, or stands in fear of him.

I am very glad, indeed, that I had this opportunity to come to Canada. When I first thought of coming I looked on the map and saw it was a foreign country, and I felt a little bit timid, never having been out of the United States before, and to come over here and face a lot of foreigners made me nervous; but now that I have been three days with you, and looked right in your faces, why you are just like our folks, perhaps a little more so, and perhaps that is what makes you good. I believe the business a man is engaged in has a great influence on his character, and a dairyman to be successful has got to be kind and gentle, and restrain his temper. He must not swear nor scold, nor make a great row. He must control himself and be kind, and I contend it makes him a better and a kinder man, and his family feels the better for it. He loves his cows so much that bye and bye

he will begin to love his wife, and it makes him a better man. As I sat last night and heard you sing "God Save the Queen" you sang it to the same tune that we sing our song "America," and I believe that these great English-speaking races will in time carry the banner of civilization over this whole world, and that we will be all one people.

THE SILO.

By Hon. John Gould, Aurora, Ohio.

I have been asked to talk about silos and feeding ensilage, and I want to say we in the States have conquered the prejudice against ensilage feeding, but we have had to do it by feeding better ensilage than we have been feeding in the past, and so to-day in Northern Ohio we are furnishing ensilage milk for the cities, ensilage milk for certified milk, and we are furnishing condensers with ensilage milk, to make the finest condensed milk to go around the world, and we do not hear any more about ensilage milk and cabbage and sourkrout, and I had to come over here to Canada to hear about Billygoat flavor and goose taste. In the first place we had to reconstruct the whole matter of corn growing for the silo, and we found out what the women had known for years. What was that? All the women know exactly how to can fruit, and if they have any doubt about the fruit not keeping, why they go and dose in more sugar and make it tremendously sweet, and we have learned over there that we must grow corn rich in sugar, and let our common corns go. Then came the question where to find that corn, and we learned that down in Virginia the common field corn that grew on the mountains was rich in sugar, that while our common field corn had four to five pounds of sugar per acre, an acre of that Virginia corn would have something like from twenty-nine to thirty pounds of good saccharine matter, and that made the difference as whether we made sweet or sour ensilage, just like a woman who makes a good apple pie; if she does not put in the proper amount of sugar it will not be a good sweet pie. We had a taste of that at the hotel. I wish I had known how a whole piece would taste.

Then came the question of cutting that corn, and when to cut, and the scientists have come to help us, Dr. Connell and all these fellows. While we do not believe all they say, we have got to come to them to find out something about corn and the corn plant, and the first thing we found out was, that it made all the difference in the world, in the development of the native qualities of the corn plant, whether it was cultivated deep or shallow. Another thing we had to learn from the chemist was that, if we kept the root of the corn cut off, it would not store as much good material as if every root was left, and so to-day you will find the Yankee cultivating his corn about an inch deep, and threatening to shoot any man who cultivated very much deeper, and they get that tremendous growth, and do not put all the value of the land into the growing of the roots, when the roots are once grown. Then when you cut that corn, it is most important to know when it is at its best estate, and so science comes in and helps us again. They showed us that when that corn plant was growing and tasseled out, and the silk began to appear, the food value of that plant would be represented by 14, and then when the ear began to form and a certain amount of kernel had begun to develop, we discovered that the food value was represented by 28, and then after the corn had developed so that it was glazing, and now and then a kernel was beginning to dent, then it was represented by 42, and then it was at its very highest estate, and it was nearest to digestibility. Now let it stand just a week longer, ten days longer, till the ears have all dented, and we find we have turned six per cent. of that good food value back into wood, that is, we lose six per cent. of our capital stock by not being ready the day we want to be. Then we learn another thing, when the corn plant is at its very best estate, if we leave it after that, drying, it turns the good sugar and starch back into woody fibre, and that can never be restored by any process. In other words, if I had a $5 bill, and I took and ore off the corner, a quarter of its value, and tried to pass the rest of it for a full $5, I could not do it; and it is the same way with your corn crop.

Then came the question of the silo. We have experimented in Ohio, and have shown last year that, with a good air-tight silo, corn put into the silo just at the point of maturity, now and then an ear showing a dent—that the loss in such a silo was only five per cent. fermentation against twenty to twenty-five per cent. loss, simply by the act of drying; in other words we saved three-quarters of the twenty-four per cent. that would otherwise have been lost. Now in that silo construction we have been up and down, and this way and that way, and finally got back pretty near where we started from at the beginning We have various sorts of silos, in the ground, and on the ground, and above the ground, and all shapes and all sizes, and all forms of wood. Two or three years ago the round silo came in, and we said now we have got it, and along in August we went out and found it all in a heap.

In my own town and vicinity, where there were more than 150 silos erected, in a diameter of ten miles, pretty nearly every one of them were round silos, and last year two hundred silos were put up in the same territory and not one of them was round, all went back to the original silo. We discovered more or less loss by the air going through the wood of the silo than in the cracks, and then came the question, how can we stop it, and that was settled by painting the silo on the outside with tar, which prevented the air going through, and prevented that loss. Another thing we have found is that if the silo is on a reasonably drained land, and not subject to standing water, that a foundation to the silo is wholly unnecessary. You can set it right on the ground. Somebody said, don't you want a floor on the silo. Why? To keep the bottom from falling out? That is on the same argument as that the world rests on the back of an elephant, and the elephant stands on a turtle. That is the argument they have in India, but there is not a man in India who knows what holds the turtle up We simply know that there is all the strength of the earth between here and China, and so we have found out the best of bottoms is a clay bottom, pounded down, made kettle shape in the bottom, and get the pressure into the centre, and made no foundation at all beyond an eight inch square stick of timber, framed as you would frame a sill. Make a trench just a little bit larger than your sill, and bed that sill into the trench, with something, and the sill will be there after your silo has been rebuilt two or three times.

Two or three things about filling the silo. What have we learned about that? Expedition. Hurry the thing up; don't wait to be everlastingly filling the silo, but fill it at once, and the best ensilage is from the silos that are filled the most expeditiously. To-day we have all kinds of machinery for this purpose. The harvesters come to cut all our corn. The best one we have looks very much like the Royal Mail cart I saw going down the street just as I came in. Another thing that has come to us is the travelling table to feed the corn, so that the man who stands there does not expend all his energy crowding the corn in. We do not even stop to cut the strings. I do not know but what we will get tuberculosis in our cows, eating Manilla twine. Another thing that came to help us was the blower. We have never yet succeeded in finding a blower that would do the work. We have never found a blower that would work a sixteen inch machine. When it comes to feeding a load every five minutes, the blower isn't in it. They were going to put a sucker on the upper end of the blower, and then I think it will go. (Laughter). We want something to help fill the silo, and we must get it. Another thing that we have discovered is that the man who treads down ensilage does not begin to weigh as much as the next load of ensilage that comes tumbling in, so where we used to have two men in the silo, a boy takes his place, and the men have gone to the field, and now five or six men are able to do the work that used to take twenty men. We are feeding ensilage as never before in Ohio, and if we go through the length of Northern Ohio, where the great quantity of milk is being made for Cleveland and Pittsburg, I will guarantee the ration is a wide open ration of one to eight, and we get more milk than we used to with the narrow ration. I do not know that the cows will last more than fifteen or twenty years but we cannot help that. We found out that this man on the farm, who could raise oats and peas and clover, does not need very much Western bran with his ensilage, and so we are raising more oats and peas, and raising more clover than ever before, and feeding more ensilage; and this man on the farm has discovered it makes a whole lot of difference to him whether he is feeding ensilage that costs 2 cents or 16 cents; and I want to say to-day we have revolutionized the feeding of this dairy cow, and that while we are raising hay, we are selling it to the man who wants to feed trotting horses,

at $12 to $14 a ton ; and we are making an acre of corn give us as much food as four acres of meadow land.

One word more and I am done. Soon it will come to pass, that, if we are not everlastingly cleaning and keeping at it at the barn and the farm, the law will put police officers there and make us. I do not know how much it will cost to buy up the police officers. I expect they are pretty honest, but what I simply mean to say is, we shall have to take this question and the purity of our milk, into our own hands. It will be better to do it that way than have it done by force. I want to go home and preach cleanliness with a louder voice than ever before, because everlasting cleanliness, and keeping everlastingly at it, is the key to successful dairying in the future.

I have said many things in a rambling way, and there are nineteen other men behind me waiting to speak. I want again to thank you for this my eighth trip to Canada.

Mr. McFarland : Have you had any experience in feeding pea meal to your cows?

Mr. Goodrich : I have never had peas to feed, but I know it is rather good feed, and that it contains about eighty per cent. protein. Peas do not grow in our country as well as they do here. Roots are excellent food for cows, but we do not feed many, because they require too much work.

A Member : We are, on our farm, making a change of food. We feed about one quarter clover. It takes six or seven tons of gluten feed to make the ration we want.

Mr. Goodrich : How much grain do you feed?

A Member : It takes about six or seven pounds of gluten feed added to what grain we have to make a balanced ration.

Mr Goodrich : Instead of feeding six or seven pounds of gluten feed, I would feed four pounds of gluten feed and the balance of bran.

A Member : That makes it expensive for us.

Mr. Goodrich : It makes a better ration in the end. Gluten food is deficient in one thing. It will make the cows produce milk, but it does not nourish the bones.

A Member : We have an abundance of corn and we are feeding it. It is a good feed for us. We produce our milk cheaper.

Mr. Goodrich : That is true, but you must have something besides corn. Some of the best milk producers I know of have been feeding brewers' grain.

Prof. Dean : Would you recommend feeding brewers' grain for milk cows?

Mr. Goodrich : A man commenced to ship it to us last year, so a good many fed it. They really produced milk cheaper than anybody else, because it only cost them $1 a ton at their towns. Last week an owner of a creamery brought a sample to my son, and said a number of farmers were feeding brewers' grain. My son went down there the next morning, stood at the weigh can, and asked the farmers what they were feeding their cows. He examined the milk carefully and took samples. While he found there was some bad milk, it was not from those who were feeding brewers' grains any more than from the others, so he came to the conclusion that brewers' grains that were sound and had not been damaged, didn't hurt the milk.

Prof. Dean : We have had some experience in feeding brewers' grains, and we found they caused one of the worst flavors to milk. We live near two breweries, and had to absolutely prohibit the use of brewers' grains.

Mr. Goodrich : That is a matter open to be discussed. They probably fed a large quantity, but in our district, it had to be shipped fifty or sixty miles, and they didn't feed so much. I would feel like cautioning people against feeding too much, or too much gluten food, or too much cotton seed meal.

THE BEST METHOD FOR HANDLING TAINTED CURD.

By W. A Bothwell, Hickson.

To overcome some of the difficulties in connection with tainted curd is a matter that has taken the experience of years. This is a matter that confronts the cheesemaker every day. More especially is this the case in our co-operative system of cheese factories, where the first care of the milk is under the supervision of so many different kinds of people.

Milk, as you all know, is an article that is very susceptible to surrounding influences, and therefore it is a matter of supreme importance that it should be kept in a pure atmosphere. Many of our patrons are very careful in this respect, but, at the same time, we all have to deal with those who are very careless, whose main object appears to be to get as much money from the factory as they can with the least effort on their part.

It is our part, then, to deal with conditions as we find them, the maker being placed in the awkward position that the patron expects him to make an A1 quality of cheese, while at the same time he is furnishing him with a very impure quality of milk. But, you may say, "the maker is sole judge as to the quality of the milk, why should he accept inferior quality?"

Anyone who has taken in milk at a large factory, where the milk has to be taken hurriedly, knows well what a difficult matter it is to detect all milk with an objectionable taint. Besides, frequently the taint is not developed until the milk is heated up in the vat, and therefore most careful makers must have ill flavored curds at times, caused by milk on which it had not been possible to detect the taint. In nearly all lines of manufacture there are supplied first-class and second-class raw materials. Out of these are made first-class and second class goods. They are classsified and the buyer pays a price according to the class of article he requires.

Shall we manufacture a second-class article? While we do not advocate this, and while we strive to do the best we can with what is supplied us, we all must admit at times the conditions are such that to make a first-class article seems impossible.

By certain modes of handling, some flavors can be entirely got rid of, and others very much lessened. I can only give you briefly my method of handling such curds:

When a bad flavor is discovered in a vat a portion of the whey is drawn off as soon as the curd is cooked up. As soon as it shows any acidity, say $\frac{1}{8}$ inch on the hot iron, the remainder of the whey is drawn off and the curd stirred well. It is then washed with water at a temperature of 96 degrees, and afterwards stirred until somewhat dry, then piled up about eight inches deep and allowed to mat. When it is solid enough to turn it is cut into strips about eight inches wide and turned over; the turning being repeated every fifteen minutes until the curd is ready for milling. This generally takes from one and three-quarters to two hours. It is then put through the mill and again washed with water at the same temperature as before, after which it is given a good hand stirring. The stirring is repeated frequently in order that the curd shall not mat, and also to allow the surplus whey to drain off, as we think a large portion of the flavor goes off in the moisture. If possible the sink should be in a draught of pure air while the curd is being stirred. A platform outside is very convenient for this purpose. It is then covered, but care is taken not to let it mat at this stage, each piece being kept separate so as to allow the moisture to pass off. When the curd becomes mellow, and has a slippery feeling, it is piled up in the sink and covered. In a short time it is stirred again and spread out as to give it all the surface the sink will allow. It is left this way for about twenty minutes, after which it is heaped up again and covered. This treatment is continued until it is ready for salting. Before salting, however, it is spread out and stirred thoroughly.

This system I have practised for some time with fairly good success, and have no doubt that many of you here before me have been following the same plan. I am of the opinion that washing the curds and stirring in a pure atmosphere is about the only remedy for bad flavors. The washing of such curds is as helpful and necessary as the washing of butter. More especially is this the case when you have over-ripe milk, when there is scarcely time for cooking the curd. The washing here serves a double purpose; not only does it assist in taking away the bad flavor, but it helps to cook the curd.

In conclusion, I would say: Exercise the greatest care in taking in the milk. Refuse any that is tainted, though should you be unfortunate enough to take any in—and no doubt you often will be—strive to make A1 cheese out of it.

A book record of each vat will prove of great service to you in determining what degree of success you may have had in any special cases.

Mr. ARCHIBALD SMITH: I wish to congratulate Mr. Bothwell on delivering such a practical, logical, and instructive address. It was right to the point, without idle talk, and that is what we want at Conventions of this kind. He makes one reference to the fact that you can make first, second, and third-class goods if you are furnished with first and second-class raw material out of which to make them. Would it be advisable, or

possible, for cheesemakers to adopt that system ? If so it would be advisable to load all these second-class goods on to the farmers who produce the raw material to make them with ; but the trouble is the maker cannot detect whether they are first-class or second-class when he receives the raw material, and the consequence is the man who produces the first class material has to suffer with the man who produces the second-class material. I believe it is true that it is in the power of the cheesemakers and buttermakers of this country to improve the quality of the milk to a greater extent than it has been improved. All our dairy journals are devoting great space to the subject of the care of milk, and yet it has not produced the desired results. Now what I advocate is that these cheesemakers refuse to accept milk from a man who has been supplying an adjoining factory. In that way the makers could say to the farmers, "you have got to take better care of your milk or I won't take it in," but at the present time he dare not say that except to a few farmers near the factory. Those at a distance where they can go to other factories cannot be talked to in that way or they will get up and leave. But if they could not get up and leave him he would have courage to control them, and they would simply have to produce good milk. As long as this present system of factory arrangement continues we will continue to receive the quality of milk we are receiving at the present time and no better. Is it not just as reasonable to expect this Association to protect the farmers who are furnishing good milk against those who are not furnishing good milk, as it is for them to protect the cheesemakers. We all admit that it is a contemptible practice for the farmer to tamper with his milk, but that does not ruin the reputation of the factory nearly to as great an extent as do the farmers who produce and supply the inferior quality of milk.

I will pass on from that to the practical part, the handling of the curd, Mr. Bothwell advocates running the whey down as soon as he sees the first indication of acid one-eighth of an inch. That is a splendid idea. I agree with him in that point, because running the whey down will not only assist in improving the flavor by being able to expose the curd to the fresh air and allowing the bad flavors to pass off, but it will also retard the acid, and enable him to make it firmer, and there will be less whey on the inside of this curd to produce flavor. If you get your whey cooked properly you have a better flavor.

Mr. Bothwell mentioned the washing of the curd immediately after dipping. I entirely agree with him on that point, I would say that it is almost absolutely essential. Washing the curd has a tendency to wash out any particles of sour whey, and also has a tendency to make the curd a little firmer, and the whey being washed out you will see at once that the flavor will be improved. I demonstrated that very thoroughly in the experiments at Milverton. The results of Mr. Bothwell's experience is exactly the same as the result of our experience.

The next point is, cutting the curd and piling it up about eight inches deep. I agree with him in that. I would not pile it any deeper. If you don't pile it up the moisture in the curd has a better chance to escape and this sour whey which goes to produce this bad flavor has a better chance to escape. I agree with Mr. Bothwell that bad flavored curds should be milled early for while the curd is piled up in the curd sink the flavor is not escaping from it, but has every chance to develop. As soon as you mill it these small particles of curd are exposed to the air, and the flavor has a chance to pass off. Washing of the curd immediatedly after milling is absolutely necessary if the best results are to be obtained. While the curd is piled up in the vat a large quantity of the whey remains on the inside, and is just partly set free when the curd is milled. When this curd is in the raw condition and the water is applied, you can easily understand this water has the effect of washing out more of this sour whey. If that material is expelled the flavor of the curd must necessarily be improved. Mr. Bothwell states that he washes at a temperature of 96 degrees. He would also tell you that you need to be guided in that respect by the temperature in your curing-room. If you are making cheese in the hot summer months, 96 degrees is possibly the right temperature at which to wash. Of course, you will understand Mr. Bothwell is making cheese in a factory fitted up better than the ordinary factory. If the room was cold he would wash it at a temperature of 98 degrees. The stirring of the curd in the sink is also a very important matter. Mr. Bothwell says you are to stir it very frequently, and not allow it to mat. He has made a good point there ; that is very essential, because if the curd is allowed to mat it means that these matty particles are holding this whey, and that you must bruise and tear the curd to get it apart, and then there is a greater loss. Now, I take it for granted that the reason that

Mr. Bothwell advocates piling it up after stirring the curd over is, that the curd has been exposed to the atmosphere so long that there is a danger of it becoming cold, and so he piles it up to retain all the heat that there is in the curd.

Mr. BOTHWELL: The idea is to keep the curd from getting too dry on the surface. When it is piled up it does not form such a tough skin on the outside. I think if you were making in the warm weather it would not be necessary to pile this curd very much, and I would leave it uncovered as much as possible, because if left exposed to the atmosphere you can readily see that by stirring it frequently the flavor passes off to a greater extent than it would otherwise.

Mr. SMITH: Another benefit in washing this curd which Mr. Bothwell advocates is, that the curd matures at least one half hour earlier than it would had it not been washed. Another advantage in washing a bad flavored curd is on account of its maturing earlier for salting. You can expose it to the atmosphere to a greater extent than if it were working slowly, when you would have to keep the temperature up. If the maker is to profit by past experience he must have kept a record of his past experience, otherwise how could he profit by it? It is necessary that every maker who is managing a factory should be an expert judge of cheese, otherwise he will not know when he is making a good quality of cheese, or when he is not. I would suggest that this paper bring out a good discussion. There are a great many makers in this room, who are all capable of asking questions. We all want information. We came here to learn from each other. You can ask ten questions in ten minutes, and Mr. Bothwell is properly qualified to answer them, and will be glad to do so.

Mr. BALLANTYNE: Every cheese maker should date his cheese, and also mark them to show in which vat they were made, and then he could refer to his record at any time.

A MEMBER: Has Mr. Bothwell noticed any trouble in weakening the body of cheese through washing after milling?

Mr. BOTHWELL: No. Our cheese has had a better body than ever they had before. We wash every curd, never miss a curd, good or bad. We don't wash the good curds when we dip, but we wash every curd in the factory.

Mr. MORRISON: How much water would you use?

Mr. BOTHWELL: Twelve pails to a good curd, and more than that to a bad one.

Mr. WILSON: How would you apply your water after milling?

Mr. BOTHWELL: Immediatedly after milling. We stir the curd over, then put on the water, and then stir over again. Stir over about three times during the process of putting on the water.

Prof. DEAN: I have noticed a tendency to openness where we washed.

Mr. SMITH: Our experience at the Experimental Station, and the experience of the last four years in washing curds, is that we make a closer cheese than by not washing. It makes a cheese that will stand the heat better, and will not open.

A MEMBER: Does it affect the yield?

Mr. BOTHWELL: It affects the yield favorably.

Mr. SMITH: Our experience proves there is a little better yield of cheese by washing.

Mr. MORRISON: How many experiments have you made?

Mr. SMITH: We experimented with thirty or forty. We experimented every month during the season, and I am quite satisfied that the results are correct?

Mr. T. E. YOUNG: Was it spring or well water that you washed your curds with

Mr. SMITH: The supply of water at the Milverton factory comes from a distance of over three hundred yards, possibly five hundred yards, from the factory. It flows down the side of the road in pump logs and empties in through a blind well. It is pumped out of that well and used in the factory. It is spring water.

Mr. YOUNG: Have you ever had any experience of washing curds from a rock well? Mine is a rock well, and I pump water from it; I never found any bad effects.

Mr. SMITH: Is this water sulphury, or does it contain any iron?

Mr. YOUNG: It is sulphury in its nature when first pumped, but it soon disappears.

Mr. SMITH: Mr. Young's experience is the same as my own. When pumping this water up first, there is a strong sulphury smell, but if you allow it to stand in an open vessel for some time that strong flavor passes off and I have not noticed any injurious effects on the cheese.

Prof. DEAN: We have been making experiments all summer in that line of work. I think it is an unsafe doctrine to preach, that all curds should be washed. After a careful study of the question, I say that for two reasons. In the first place, many cheese factories have not water and barrels suitable for washing, and secondly, our experiments demonstrate that washing the curds decreases the yield of cheese. I do not wish to discredit the work done by the Milverton Experimental Station, but our work has been done very carefully, and by one of the best men we could get. We divided the curds into two portions, washing one and leaving the other part unwashed. After averaging our whole season's work we found that the yield of cheese was a little over one pound less of cheese per thousand pounds of milk. While there are many curds that are materially improved by washing, it would, I think, be a decided mistake to advise all makers to wash all the curds, for the two reasons I have named. (Applause.)

Mr. SMITH: I claim that any factory where the water is unfit for the washing of curds is unfit for the making of cheese, because, if you have not a pure supply of water you cannot get the good results. If the water is not suitable, why not pasteurize it and allow it to cool down? As regards the average, they were improved by washing except when the curds were particularly firm, then there was scarcely any difference. Immediately the curd is milled we turn it over once, spread it out in the sink, and put on about four pails of water, spread it evenly over the curd, then turn the curd over and put on four more pails, then turn the curd over and put on four more pails, and by that time you have the curd washed sufficiently, using 12 pails of water. By washing the curd at over a temperature of 100° there was no improvement in the average. It took just as much and in some cases a little more milk to make a pound of cheese, but when washed at from 94° to 95° there was invariably an improvement in the average.

Mr. BOTHWELL: The buyers have been telling me all this year that we have a decidedly better quality of cheese, and that they like it better. Which are we to sacrifice, the quality or the average?

A MEMBER: How does Mr. Bothwell manage food flavors, such as turnips, etc?

Mr. BOTHWELL: We wash them just the same as the others, but we are not affected much with such bad flavors. We have only had two or three batches of turnip flavor in two or three years.

A MEMBER: What about apples?

Mr. BOTHWELL: We do not grow apples down there.

Mr W. R. SHEARER: I have heard farmers say they get more milk when they feed apples to the cows, and I have heard others say it makes a bad flavor in the cheese. Now, if there is any explanation for that I would like to know something about it.

Prof. DEAN: That point came up yesterday and I answered it. We found that apples gave a decidedly apple flavor to the milk, to the curd and to the cheese, and we found further, that apples fed to the cows tended to decrease the quantity of the milk, but that apple pomace gave an increased quantity of milk.

A MEMBER: Would apple pulp, after the cider was extracted, have the same effect on the curd as whole apples?

Prof. DEAN: Yes, it gave a bad flavor to the curd and to the cheese. There was this difference, apples tended to decrease the quantity of milk while apple pomace increased the quantity.

Mr. MACFARLAND: I have fed apples to cows for many years, and find that they always increase the quantity of the milk.

The CHAIRMAN: You must have trained and bred your cows on that line.

Mr. MACFARLAND: Yes.

Mr. MILLER: Our experience is that when patrons fed apples they dried up their cows. One of our patrons had a quantity of apples that were not saleable at a time when he was sending about 300 pounds to the factory. The second day after he turned the cows into the orchard he did not send any. We had another patron who was sending 400 pounds. The cows got through the fence into the orchard, and the day after that he sent 190 pounds, and he never got his cows to do as well after that during that season.

Mr. MORRISON: I might give you another reason why apples should not be fed to cows. Last fall milk came to the factory that showed indications of water, and I spoke to the patron about it. The only reason he gave for water being in the milk was that

the cows had broken into the orchard and eaten about ten barrels of apples the night before. He had six cows.

A MEMBER: It is a fact that every farmer knows that where cows break into the orchard the cows will be injured. I have known cases where cows have got into the orchard and eaten so many apples that they could not get up for two or three days, did not get over it for the whole season; never gave the same quantity of milk again.

The CHAIRMAN: It is the old Adam that is in them.

A MEMBER: Did I understand Mr. Dean to say that feeding a small quantity, half a bushel a day, would decrease the quantity of milk? One of our patrons bought a quantity of apples and fed a small quantity a day. He said it increased the milk.

Prof. DEAN: You will find the full results of our experiments in the press. There was a decrease of between 30 and 40 pounds in 12 days, where apples were fed.

A MEMBER: Was it for the purpose of testing this that the apples were fed?

Prof. DEAN: Yes. We had to buy the apples. We were out the price we paid for the apples, and had less milk.

Mr. MORRISON: If there are any makers who practise washing curd, and who have had experience with bitter milk I would like to hear of it.

A MEMBER: What effect would too much saltpetre have upon cheese?

Mr. BOTHWELL: I think you would have to a great deal of saltpetre to get a flavor on cheese. There is very little flavor in saltpetre.

A MEMBER: I have heard it said that in districts where they feed turnips that the the patrons feed saltpetre also.

Mr. MORRISON: I remember once when I was in the factory there were turnips being fed. I put a tablespoonful of saltpetre in a vat of milk of about four thousand to five thousand pounds. I have heard several makers say they would about as soon have the turnip flavor as use any more saltpetre, because the saltpetre flavor was just about as bad as the turnip flavor.

Mr. BOTHWELL: We never had any complaint of turnip flavor in our cheese. We never use more than half a cupful of saltpetre to a five thousand pound vat of milk, and I think, in that quantity, it will take a pretty long nose to detect the flavor of saltpetre.

LESSONS FROM A TEN YEARS' RECORD OF A DAIRY HERD.

By PROFESSOR H. H. DEAN, O.A.C., GUELPH.

I shall divide my talk this afternoon into seven different headings. The orthodox sermon generally has about three heads, but we wish to go further, and will direct our remarks to: (1) the man beside the cow; (2) the stable containing the cow; (3) the food given to the cow; (4) the cow herself; (5) the milk given by the cow; (6) the butter made from the milk given by the cow; (7) the cheese made from the milk given by the cow.

THE MAN BESIDE THE COW. Men who are successful in the handling of dairy cows are born, not made. It is a very difficult matter, indeed, to hire the right kind of man to put down beside the cow. He must possess the following characteristics. He must be kind, observant, have good judgment, be sympathetic, prompt, regular, clean. These I consider the seven cardinal points of a successful dairyman. A man combining these qualities is a jewel, rare and valuable. Some men that we have had in charge of our herd feed more food and obtain less milk than one who has the knack of feeding and caring for cows, and who possesses the seven stars of the order of the cow. We have found it very difficult to hire men who will get the most out of the cows for food and labor expended. This is one advantage which the man who owns the cows has over any institution which has to depend on hired help to feed and care for the cows.

THE STABLE. The stable first of all must be kept clean. It should be cleaned twice a day, and not at milking time. We have found sawdust and gypsum, or land-plaster, to be excellent absorbents for keeping the cows clean and preventing bad odors in the stable. The gutter should be scrubbed with hot water and lye about once a week. The whole inside of the stable should be white-washed at least once a year. We find that

adding a handful of salt to a pailful of ordinary whitewash causes the whitewash to stick to the boards more closely and gives a nicer appearance to the stable. We have used the whitewash recommended by the Association, and find it of no special advantage for inside work, and it is more costly and troublesome to prepare than the ordinary whitewash. Mangers should be cleaned out every day. The bottom of the manger should be made of cement, as wood rots very quickly, and is almost impossible to keep clean. Cement floors are no doubt the coming floors for the cow stable, although in our own stable we use wooden floors. The stable should be light and should be ventilated in such a way that fresh air is brought into the stable without causing a draft upon the cows. In winter this air should be warmed before it enters the stable. This can best be done by means of a sub-earth duct, such as is used for cooling and ventilating curing rooms. To remove the foul air from the stable, there should be a ventilator at the ceiling of the stable, and also near the floor. The ventilator at the ceiling removes the warm foul air, and the ventilator near the floor removes the heavier and cooler gasses. We have found that tying cows with a chain on which there is a ring at the end to slide on a pole or iron is quite satisfactory, and is also a safe method. In every stall where disease or abortion has been, the manger, floor and gutter should be thoroughly disinfected with a strong solution of crude carbolic acid, and it is always a good plan to whitewash the manger and stall after the animal has been removed. In case of abortion the cow should be kept away from the rest of the herd until all discharge ceases, or the disease may be spread through the whole herd owing to the fact that germs will be found in the stall, gutter and manger, and are likely to find entrance to other animals. Every stable should also have box stalls for cows at freshening time and for young calves. Watering devices in the stable are difficult to keep clean, and they also tend to cause the rotting of the woodwork in the stable. We have tried two or three devices in the dairy department for watering cows, none of which have proved entirely satisfactory.

The Food Pasture, corn silage, mangels, clover hay, bran, oats and peas are the seven best foods for the Ontario dairyman—pasture, corn silage and bran for summer; silage, mangels, clover hay, bran, peas, and oats for winter. The following we have found to be a very satisfactory ration for cows weighing from 1,000 to 1,200 pounds; thirty to forty pounds of corn silage mixed with from eight to ten pounds of cut clover hay; twenty pounds of pulped mangels; four pounds of bran; two pounds of oats, and two pounds of peas. The meal is fed on the roughage or bulky portion of the ration. In the afternoons during the winter the cut hay, silage, and pulped roots are mixed together in a large pile sufficient for two feeds; on Saturday afternoon sufficient bulky food is prepared for four feeds. We feed our cows twice a day in winter. We find that cows milk as well, and it is less labor to feed them twice a day as compared to feeding three times a day. We have also found that it requires about eight pounds of meal or concentrated food for each pound of fat the cow produces in her milk. This may be taken as a very good guide in the amount of concentrated food required to feed dairy cows. Give her all the rough food she will eat, then add to this about eight pounds of concentrates for each pound of fat she is producing in the milk. We also feed green peas and oats during the first two weeks in July when the pasture is scarce; but for the past two seasons we have depended largely on corn silage and bran to supplement failing pastures. Every dairyman should provide a summer silo filled with good corn silage to be used during dry seasons In this way the flow of milk may be maintained cheaper than by any other method that I know of.

The Cow. In 1891, when I took charge of the dairy, there were 15 cows in the herd which had been selected with great care by my predecessor, Prof. Robertson These cows during that year averaged 6,000 pounds of milk per cow. During the year 1900, we had 30 cows in the dairy herd of which 23 were in the herd for the full year. These averaged more than 7,000 pounds of milk per cow. During the ten years we have had in our herd, representatives of five different breeds—Holstein, Jersey, Ayrshire, Guernsey, and Red Polled. We also have had a number of grades of nearly all breeds, and some of no particular breeding. At the present time we have more black and whites than of any other color. Cows of this breed have proved very hardy and good milkers. They require liberal quantities of food. During the ten years, but 22 cows have remained in our herd for three or more lactation periods. Only one cow, a pure bred Ayrshire, has been in the herd for nine lactation periods; and no cow is found in the herd at the present time that

was there ten years ago, showing how rapidly does the herd change where proper selection or weeding is practiced. Our cows during that period have milked from 201 to 365 days of the year. They have given from 3,035 to 10,090 pounds of milk in a year. They have produced from 109 to 385 pounds of fat per cow in a year. Cows producing the largest quantity of milk have been Holsteins. The largest amount of fat produced per year has been given by a pure-bred Jersey. The Ayrshires take a medium position in both quantity and quality of milk. July and August, we have found to be the most unfavorable months for cows to freshen. Cows freshening during either of these months have usually given less than their normal quantity of milk during the year. January, June and September appear to have been the most favorable months for producing a large flow of milk. Cow's milk tests as high during their first lactation period as at any other time afterwards as a general rule. We have had two marked exceptions to that rule in the case of a pure-bred Holstein and an Ayrshire grade, which gave much poorer milk than formerly during their first lactation periods. We have also noticed that the tendency is for the average per cent. of fat in the milk to be lower after a cow becomes ten year old. A pure-bred Holstein gave her highest average test when six years old. A pure-bred Ayrshire gave her highest test when four years old; and a pure-bred Jersey gave the highest yearly test when six years old. Cows have given their largest yield of milk when from 6 to 8 years old, although in the case of a pure-bred Ayrshire cow the largest yearly production of milk was when she was ten years old, but this followed a year in which she had given less than her average quantity. As the average of 109 lactation periods with 33 cows, we find that there is little difference in the percentage of fat for the first three months of the lactation period. After the first three months, the percentage of fat gradually increases until the cow dries up or ceases to milk. The largest yield of fat and milk was given in the second month of the lactation period, according to the average of 109 lactation periods. Cows giving milk below the average percentage of fat tend to give richer milk in the first month of the lactation period, especially those cows high in flesh at the time of freshening.

In 1891, six cows, after having milked for fifty days, producing milk with an average percentage of 3 49 fat during a period of 91 days During the next period of 91 days, the average percentage of fat was 3 66, and during the third period of 91 days, the average percentage of fat 3 95. The first week of this test, the six cows averaged 3.83 per cent fat. During the last week of a test of 274 days, the average per cent of fat was 4 08, an increase of .25 per cent fat in the milk. One of these cows gave richer milk during the first week of this test than she did during the last week, showing that there are some exceptions to the rule that the milk of cows gets richer as they increase in the lactation period.

We have found with the cows in our herd that there is a marked difference in the creaming quality of milk by gravity process in different cows. For instance, a cow gave milk with 3.68 per cent fat in it; and, after setting for 24 hours, the skim-milk contained 2.26 per cent fat. Another cow fed on the same feed and under the same conditions gave whole milk testing 5.56 per cent fat, and when this milk was set for 24 hours, the skim-milk contained but .1 (one tenth) of a per cent of fat. When the milks of these two cows were mixed together, it was found that the milk of the second cow assisted the creaming of the milk given by the first cow. With the cream separator, however, there is very little difference in the creaming quality of the milk from the different cows, where sufficient speed and proper temperature are maintained.

We have found that the percentage of fat in milk is not affected to any extent by the food given to the cow. We have also found that the cow will produce more fat in her milk than there is fat contained in the food, showing that she has the power to produce milk fat from something other than the fat contained in the food. As an example of this, two cows were fed four pounds of fat in their food during one week. These cows gave 9.24 pounds of fat in their milk during the same week. In another experiment 3 cows on grass ate on an average about seven and a half pounds of fat in one week, and these produced seventeen and a half pounds of fat in their milk.

Skim milk, bran and oats have been the best foods with which we have experimented for rearing young calves. Our plan is to feed calves on whole milk from two weeks, to one month; then gradually change to warm sweet skim milk, in which we place some bran and ground oats. As soon as the calves will take the meal dry, this is put in a man-

ger convenient for them to reach, along with some pulped roots and clover hay. We keep our calves in the stable during the first season, and find that they are much more thrifty than when allowed to run outside. These heifers freshen when from two to three years of age. If, at the end of the second lactation period, they do not come up to our standard of 6,000 pounds of milk or 250 pounds of butter, we sell them to the butcher and replace them with better cows.

The Milk We have found that the food cost of one gallon of milk has varied in individual cows from three to six and one-half cents for the year. The months of December and November in ordinary seasons are the most expensive months for the production of milk. In dry seasons, like that of 1900, in Western Ontario, August and September were the most expensive months in which to produce milk. By charging pasture at $1 per month per cow, June is the least expensive month in the average of seasons. In 1897, the month of August was the least expensive month, as we had excellent pasture during the whole month.

We have found that a record of each cow is very valuable. We use first a pair of spring balances for determining the weight of milk given by each cow night and morning. This is recorded on a milk sheet holding the weight of milk given morning and evening by thirty cows for one month. At the same time that the milk is weighed, a sample is taken and placed in a composite jar which is tested monthly. At the end of the month, the milk sheet and the composite jar, or sample, is taken to the dairy, the weight of milk is transferred to a book kept for that purpose, the composite jar is tested, and the percentage of fat is also recorded in the book. At the end of the year, we know the pounds of milk, the pounds of fat, and the number of days which each cow in the herd has milked. In this way, we were able to weed out our cows, and thus keep gradually improving the standard of our herd.

Milk is very often tainted while being milked in the stable by an admixture of tainted air with the stream of milk as it passes from the cow's udder to the milking pail. Milk is more frequently tainted in this way than by absorbing taints as the milk stands in the stable. Experiments conducted by us indicate that milk does not absorb taints so long as it remains at a higher temperature than the surrounding air. As soon as it cools to the temperature of the surrounding air, it quickly absorbs any bad odors which may be in the vicinity of the milk. The milk strainer should made in such a way that it will take out all dirt, and it should fit the top of the can tightly to keep out flies. Flies getting into the milk are a constant source of bad flavors and trouble to the dairyman. So far, we have not found milking machines to be entirely satisfactory. We have tried the "Murchland" and the "Thistle." The chief objection to the Murchland milking machine was that the cows did not give so much milk, nor did it test so high in butter fat as when the same cows were milked by hand. With the "Thistle" the cows gave as much milk, and of the same quality as when milked by hand. The chief objection to the "Thistle" was the bad flavor which the milk had when drawn with this machine. This was caused by milk getting into the pipes through which the air travelled on its way to the milking pail, thus becoming mixed with the milk. No doubt a successful milking machine will be placed upon the market before we have gone very far into the 20th century. A good deal has been made of the fact that sympathy between the cow and the milker is necessary in order to get a full flow of milk. This is doubtless true in the case of some cows, but, taking our herd as a whole, the results with the "Thistle" Milking Machine indicated that there is probably more sentiment on this point than real fact. When the cow becomes accustomed to the milking machine, she will doubtless give as much milk and milk as rich in butter-fat, as if she were milked by hand, and more milk than when sucked by a calf.

The Butter. The food cost of a pound of butter has varied from six and one-half to fourteen and one-half cents per pound with individual cows. The food cost of the butter as of the milk, varies a great deal with individual cows, with the cost of feed, the season, and a variety of conditions. So far our results have gone to indicate that a cow which is specially built for the production of butter-fat will produce butter-fat at least cost for food. The cow which has produced a pound of butter at the least cost was a pure-bred Jersey. The best cows of this breed are doubtless specially suited for the manufacture of food into milk fat.

The hardness of butter, we find is affected by the cows and by the food given to the cows. Jerseys tend to give very firm butter. Individual cows of other breeds also give firm butter. Foods affect the firmness of butter in the following ways: Cows on pasture produced butter with an average melting point of 32.3 degrees C. These same cows when fed on silage, straw and hay, produced butter with an average melting point of 31.75 degrees C. Fed on hay, peas, oats and corn the average melting was 33 degrees C. Fed on hay, oil-cake and cotton seed meal, the melting point was 34.62 degrees. Fed on hay and oil cake the melting point was 33 degrees. On hay and cotton seed mail, the melting point was 36.5 degrees C. We thus see that cotton-seed meal tends to make butter very firm. Pasture and silage tend to give butter somewhat soft, the melting of which is four or five degrees below that of butter produced by feeding cotton-seed meal. The flavor of butter is not dependent so much upon food as upon the proper ripening of the cream; that is, where the foods fed have not of themselves any objectionable flavors, such as turnips, turnip tops, rape, etc.

The Cheese. The food cost of a pound of cheese varied from three to six and three-quarters cents with individual cows in the herd. The cheese yield of milk is closely allied to the fat in the milk, but is not exactly the same. The factors 2 added to the percentage of fat fairly represents the cheese producing value of milk, and this system we recommend to patrons of cheese factories as the best method upon which proceeds may be divided among the different patrons Milk with from three and a half to four per-cent fat seems to be best suited for making Canadian Cheddar cheese. The use of a good pure culture, handled by a trained cheese maker, will materially improve the quality of Canadian cheese, if the patrons will deliver to our factories clean milk at a temperature not above 60 degrees in hot weather.

The Dairy Bacteriologist and the Dairy Chemist, along with practical observation and testing of our dairy herds, will add a great deal to the value of the dairy industry in Canada.

These lessons have been gathered during ten years from our dairy herd in connection with the Ontario Agricultural College.

A Member: That question of aerating the milk is one of the things we have advocated for many years. I would like to ask Prof. Dean what we should ask the farmer to do now, when we ask him to undo what we have been asking him to do.

Prof. Dean: I advocate cooling milk to a temperature of 60 degrees when the milk comes into the factory in a sweet condition, unsuitable for cheese-making, and the cheese-maker must have prepared the proper culture or starter. The cheese maker that can get the milk in at his factory below 60 degrees, and understands the proper use of culture or starter, and uses it with judgment, has the key to the whole situation. The only advantage of aerating is the cooling. I believe the time will come when every farmer will provide a suitable tank or box and have plenty of cooling water and ice to enable him if necessary, to have the milk properly cooled at the farm, then also to provide protection for the waggons while on the road to the factory I say that the time will come when every milk waggon will have a cotton cover to keep the dust and sun away from the cans. When we have done these things and have put our factory in a sanitary condition, we shall have solved many problems. Ten years hence we will laugh at ourselves about worrying over these things simply because we didn't get at the root of the matter. There is a cause for every one of these things. It is for us to find out the cause first, and then apply the remedies. I say now that all the farmers who are patrons of cheese factories should cool the milk to a temperature below 60 degrees, and that every cheese-maker and butter-maker should make a thorough study of starters I don't like that word starter. I think the word culture is very much better, but every cheese-maker should understand the propagation and use of culture, then when he gets the milk in a sweet condition he will be in a position to control the different flavors that give so much trouble.

A Member: Do you think that cooling the milk in an air-tight room would do as well as to cool it in the open air?

Prof. Dean: I think the lid should be off the can during cooling, and that the milk should be stirred, then if there is any flavor there, it will pass away; but I believe that if the cow is clean and healthy and fed a healthy food, this cow flavor will be unknown. If the can of milk were put into a tank of cool water, and the milk stirred till it was reduced to 60 degrees, many of these bad flavors would pass away.

A MEMBER: My personal experience has been that some sort of cooling which exposes the milk on a large surface has a good effect. I have cooled a great deal of milk in that way for butter-making.

Prof. DEAN: If there is any bad flavor in the milk stirring lets this off, but if you have a healthy cow fed a clean food and milked in a cleanly manner there is no bad flavor.

Mr. A. T. BELL: I have been told that the condensing factory at Ingersoll had some mishap A cheese-maker there got over 4,000 lbs. of milk from the factory that was cooled down to 50 or 55 degrees. When he got that milk to the factory he thought to himself "now I am going to have something fine." He had a good starter. He introduced the the starter into the milk and after a while got it ripe enough to set. The worst cheese he had that season was from that milk. The stables had been inspected by inspectors and everything reported to be kept in very best of order, so he lays the blame to the cooling of the milk. I am not saying the cooling of the milk caused this, but the worst cheese he had this summer was from that cold milk. I may say, in reference to that point, that if you cool milk for cheese making and don't use a starter you will have trouble with gas. I do not recommend cooling as low as 40 or 50 degrees. When you get too low you paralyze the lactic acid germs. If a man has a good starter or culture to put into the milk he can control these bad flavors. I would not like to say that in this case it was due entirely to cooling, for I believe milk handled in that way will produce good cheese if you have a good starter.

Mr. SMITH: Have you made experiments with milk cooled to a low temperature as compared with the same milk handled at a higher temperature?

Prof. DEAN: We have made these experiments during this past season. We have cooled one part and have kept another part uncooled, and by the use of that good culture or starter we have found that in every case, the quality of the cheese was "improvement."

A MEMBER: My experience is not altogether in accord with yours. I had a patron that always sent good milk, one day the milk he sent to the factory was bad, and I went to him and asked the cause. He said it had not been properly stirred. Next morning his milk was badly tainted through cooling down without aeration.

Prof. Dean: I am speaking of the ordinary aeration without any cooling In a great many cases stirring does good, but ordinary aeration with aerators such as the Champion, is of no advantage whatever. It does not make a better yield of cheese nor does it give us in any way whatever a return for our labor. How low was the milk cooled to that you speak of?

A MEMBER: I could not say, he may have cooled it just low enough to give it a bad flavor.

A MEMBER: I think a great deal depends on the condition of the cows in the hot weather. We do not want to lay too much blame on the farmers' shoulders, but still I think they should take into consideration that the condition of the herd varies in the hot weather, which will vary the condition of the milk, and that these changes necessitate a different manner of caring for the milk. For these very reasons I am satisfied that I have had trouble with milk through its not being stirred while it was cooling.

Prof. Dean: I am not advising the people to put a can of milk into cold water and then not stir it, because they could not get it cooled in that way. The milk on the outside would get cooled and the inside would be warm. You must stir the milk while it is cooling. What I was talking against is the ordinary aeration of the milk without any cooling. I believe the ordinary aeration without cooling is of no benefit whatever.

Mr. A. T. BELL: Don't you think that by cooling down to 55° or 60° it would be more likely to take in bad odors from the atmosphere? If it is cooled below the temperature of the atmosphere?

Prof. DEAN: In any case the milk comes to the same temperature as the atmosphere. You leave a can of milk anywhere you like, and it will come to the same temperature as the atmosphere. Then as soon as it comes to that temperature it begins to take in these odors. At a low temperature they do not develop. If you leave it at a temperature of over 70° you make the conditions favorable for the development of the bad germs.

REPORT OF EXHIBITION COMMITTEE.

By T. B. Millar, London.

I have much pleasure in submitting to you the report of the Exhibition Committee.

The Committee of the Winter Dairy Exhibition beg to report as follows :—

1. This Committee was appointed by the Board of Directors, one of its duties being the promotion of the Winter Dairy Exhibition.

2. The Committee was authorized by the Board to offer cash as prizes for excellence, amounting in all, to $318.

3. Of this amount the Committee offered :—$150 as prizes for August cheese ; $100 as prizes for October cheese ; $68 as prizes for creamery butter ; as follows :—

Class 1.—Cheese made from August 15th to 31st

Sec.		1st.	2nd.	3rd.
1.	One White Cheese	$50.00	$15.00	$10.00.
2.	One Colored Cheese.....	50.00	15.00	10.00.

Class 2 —Cheese made from October 15th to 30th.

Sec.		1st.	2nd.	3rd.
1.	One White Cheese	$25.00	$15 00	$10.00
2.	One Colored Cheese.....	25.00	15.00	10.00

Class 3 —Creamery Butter.

Sec.		1st.	2nd.	3rd.
1.	Fifty-six Pound Box.....	$25.00	$15.00	$10.00
2.	Ten One Pound Prints.....	10.00	5.00	3.00

The Cheese in Class 1 to be shipped to the Superintendent of the Illustration and Experimental Station at Milverton not later than September 25th.

4. For these prizes 17 makers made 24 entries of August cheese, 11 White and 13 Colored. 22 makers made 33 entries of October Cheese, 19 White and 14 Colored. 23 Makers made 43 entries of Creamery Butter, 22 in boxes, and 21 in prints. In all there were forty exhibitors who make exactly 100 entries.

List of Exhibitors :—Frank Boyes, Kingsmill ; W. A. Bothwell, Hickson ; A. F. Clarke. Poole ; J. R. Hutchison, St. George ; J. A. McIntyre, Palmerston ; Alex. McKay, Brooksdale ; James Bristow, Sebringville ; F. S. McEwen, Gladstone ; W. B. Thomson, Nile ; Mary Morrison, Newry ; W. F. Baskerville, Clinton ; S. A. Smith, Avon ; Wm. D. Consley, Monkton ; A T. Bell, Tavistock ; John C. Bell, Winchelsea ; Thomas Malcolm, Kinlough ; W. J. McCully, Stratford ; T. O'Flynn, Tavistock ; E M. Johnston, Innerkip ; James S. Grieves, Verschoyle ; George A. Boyes, Mapleton ; J. S Isard, Paisley ; W. G. Medd, Medina ; J. G. Patterson, Molesworth ; W. A. Bell, Pine River ; M. Morrison, Harriston ; G. B. Brodie, Gladstone ; Walter Hamilton, Listowel ; Joseph Babb, Gilford ; Robert Ireland, Beachville ; P. W. Brown, Centralia ; John Malcolm, Sheffield ; B. Bond, York ; Duncan M. Scott, Holmesville ; Fred. Dean, St. Marys ; H. Weston Parry, Compton, Que. ; J. R. A. Lang, Avonbank ; Thomas F. Boyes, Mapleton ; G. M. McKenzie, Ingersoll ; S. P. Brown, Birnam.

5. Your Committee consider the result of this year's Exhibition satisfactory, and recommend that it be continued and developed.

All of which is respectfully submitted.

T. B. Millar, Chairman.
W. W. Harris.
George H. Barr.
John Brodie.
M. R. Brown.

WINTER DAIRY EXHIBITION—REPORT OF JUDGE ON CHEESE.

By I. W. Steinhoff, Stratford.

In submitting my report as judge of cheese at the Winter Dairy Exhibition, let me explain that Mr. T. B. Millar and I were to act together, but as Mr. Millar was unex-

pectedly called away, the Board entrusted the entire responsibility to me. This confidence on behalf of the Dairymen's Association of Western Ontario I very highly appreciate.

Permit me to say then that there is most to be learned from the exhibit of the August cheese. These had been previously scored by Mr. Millar at Milverton, and afterwards all held under the same conditions and temperature while curing, then scored again by myself here.

These cheese, while not scoring very high, are upon the whole, of very fair quality, when we consider the hot weather and very unfavorable conditions for producing fine cheese which existed this year during the last half of August, when they were made.

In scoring these August cheese I did so without referring to the book containing Mr. Millar's record of his score on or about October 1st, at Milverton and his notes thereon, except on point of finish, upon which point I thought the proper time to pass judgment was when they were first examined, so that they should not suffer from any injury which they might receive afterwards. It will be noticed that there is but very slight difference in any case on point of finish.

I submit below for the benefit of the makers Mr. Millar's notes, together with the score in both cases, the total results on cheese taking prizes and a few other examples from which something can be learned.

It will be noticed that Mr. Millar's expectations as to development of these cheese, as indicated in his notes, have been pretty clearly borne out.

First prize White Cheese, W. A. Bothwell, Hickson. Note—"Local flavor; think it will improve; fairly good texture, but think it will deteriorate with age."

	Flavor	Texture	Color	Finish	Total
Score	42-43	27-29	14-14	10 10	189

The result would indicate in this particular that the texture has not deteriorated with age, but rather improved.

Second prize, White Cheese, W. Hamilton, Listowel. Note—"Lacks cheesy flavor, texture rough and mealy, indicates being stirred very dry in sink"

	Flavor	Texture	Color	Finish	Total
Score	40-43	25-26	14-14	9½-10	181½

Third prize White Cheese, W. G. Medd, Medina. Note—"Not perfect but good keeping flavor. Rough texture, not silky.

	Flavor	Texture	Color	Finish	Total
Score	42-41	25-26	13-14	9-9	179

V. H. C. White Cheese, M. Morrison, Harriston. Note—"Not perfect, but think it will improve in curing, texture slightly rough."

	Flavor	Texture	Color	Finish	Total
Score	41-36	28-28	15-14	8-8	178

In this particular case the flavor had not developed favorably as expected.

First prize Colored Cheese, G. B. Brodie, Gladstone Note—"Very good flavor, very good texture."

	Flavor	Texture	Color	Finish	Total
Score	43-43	27½-28	14-14	7-7	183½

You will note here that three points are lost on finish.

Second prize Colored Cheese, W. B. Thomson, Nile. Note—"Lacks flavor, possibly a little weedy, texture mealy."

	Flavor	Texture	Color	Finish	Total
Score	42-42	25-27	14-14	9-9	182

In this case the local or weedy flavor which Mr. Millar thought slightly noticeable has not developed as the scoring will show.

Third prize Colored Cheese, M. Morrison, Harriston. Note—"Local flavor, texture a little rough, showing too much moisture and a little inclined to be gassy."

	Flavor	Texture	Color	Finish	Total
Score	41-38	26-29	14-15	9-9	181

These are all the notes upon the cheese which have received prizes, but there are some others upon which notes were made by Mr. Millar, which are worthy of note.

Exhibit O.—Note—"Nice flavor, texture might be more silky."

	Flavor	Texture	Color	Finish	Total
Score	43-43	27-26	14-13	6-6	178

I wish you particularly to note here that this exhibit would have taken either second or third place if it had been perfect in finish. This cheese was debarred from receiving a prize on account of finish. This is to be regretted because it is a point that is in the power of the cheese maker to control.

Exhibit F.—Note—"Too much moisture, inclined to be gassy."

	Flavor	Texture	Color	Finish	Total
Score	43-42	27-28	13-8	9½-9	179½

This cheese I found to be a clear illustration of "mottled", and you will notice it lost seven points for color, which debarred it from being in the prize receiving class.

Coming to the October cheese, I found a much more perfect grade of cheese in the white class, but the colored did not come up to what we might reasonably expect from October cheese exhibited under such favorable conditions.

The score is as follows—

October White	Flavor	Texture	Color	Finish	Total
1st. A. F. Clarke	44½	29	14½	9	97
2nd. J. A. McIntyre	44	29	14½	9	96½
3rd. T. O'Flynn	44	29	14	9	96
V. H. C. J. S. Isard	44	28	14½	9	95½
Mary Morrison	42	28	14½	10	94½
October Colored					
1st. W. A. Bell	44	29	14½	9	96½
2nd. Geo. A. Boyce	44	29	14	8½	95½
3rd. J. S. Isard	42	28	13	9	92

REPORT OF JUDGE ON BUTTER EXHIBITS.

By Prof. H. H. Dean, O. A. C., Guelph.

I beg leave to submit the following report.

There were sixteen boxes of butter on which the score varied from 85 to 97¾ points. The butter was generally of good quality. One lot was too mildly salted, and some lots were too highly salted, for the export trade. A few boxes were finished in a stylish manner, but many were not so clean and stylish as they might be.

56 Lb. Box—There was only a little difference between the 1st, 2nd and 3rd prize butter, the scores being 97¾ J. R. Laing, Avenbank; 97½, Thos. Malcolm, Kinlough; 97, E. M. Johnston, Innerkip; very highly commended, William Bothwell, Hickson, 96½ points.

Butter for export should be milder in flavor, lighter in color, and milder in salting than butter for local markets. Texture, or grain is not so important in butter sent to the British market. It should be waxy, and of such consistency that it is easily spread on bread. Very hard butter, and greasy butter are two extremes which should be avoided.

Ten 1 Lb. Print.—There were fourteen lots of pound prints, the highest score of which was 98½ points, Thomas Malcolm, Kinlough. This lot was almost perfect for local trade, and reflects great credit on the maker. The scores of the second and third prize lots were 95 E. M. Johnston, Innerkip, and 95 by S. P. Brown, Birnam, respectively. Very highly commended, G. W. McKenzie, Ingersoll, 94 points. Many of the lots of pound prints were badly salted "Gritty" and "too heavily salted" were the chief faults. One lot was too lightly salted. Several lots were mottled, which could have been remedied by working the butter the second time.

Cream which is to be churned into butter to have a high flavor should have from 5 to 6 per cent. acid before churning. Makers who churn two lots of butter from the same lot of cream—one lot for export and one lot for local trade, are sometimes disappointed in their scores because a judge should adopt a different standard in each case.

The Chairman: The man who took the first prize for the cheese has kindly donated it to the convention. The cheese will be cut up, and every person here will have a taste of that cheese. Mr. Bothwell is a good fellow.

CREAM-GATHERING CREAMERIES.

By Mr. Archibald Smith, Strathroy.

In speaking on this subject of cream-gathered butter-making, I wish to confine my remarks to the buttermakers of the district west of Toronto—the district of which I have charge. I would like to say a few words on the condition of the factories, and then consider the question of cream-gathered butter factories, and separator butter factories, also in a few words some of the methods of improving the quality of the butter at the cream-gathered factory to making it equal, if not superior, to that produced at the separator factory ; and I will endeavor to show you if I can, that it can be easily done. In counties north of us the land is somewhat different to what it is here, and the people farm on a different principle. The roads are hilly. It is impossible to draw milk from any great distance, so the farmers engage in beef raising more than in dairying, and therefore do not keep a great many cows. It is impossible to collect a very large quantity of milk in a narrow district, and therefore cheese factories and butter factories cannot exist and be successful unless they go into the cream-gathering system, which allow them to extend their territory and take in a larger amount of cream, and to make a larger amount of butter, and so make a financial success of the business.

I think this cream-gathered butter-making has come to stay. It was here before the separator system, and it has paid more successfully than it ever did before. It is growing each year, and I contend that the manufacture of the cream-gathered butter is of more importance to the farmers and dairymen of this country than that of the separator system, and I want to advance to you my argument. The quantity of butter made to-day by separator system dwarfs into insignificance when compared to that made by the cream-gathered system operating in summer. The latter are nearly all small, with the exception of the one at St. Marys, whereas, in this northern district, we have a number of cream-gathered creameries turning out 3,000 pounds of butter a day ; so you will see the out-put of butter in the cream gathered districts is enormous compared with that in the separator creameries. Another argument for putting forth greater effort for improving the quality of cream-gathered butter is, that during the summer months when they are in existence they produce a large amount of butter which is exported to Great Britain. At the present time we are selling more of our butter locally, in London. Toronto, Hamilton and Montreal, very little of it being exported. However, if we are to build up a reputation for this Canadian butter, we must improve the quality of the butter that goes abroad, and it is the cream-gathered butter that goes abroad in the greatest quantity, and, therefore, that is the system of butter making to which we must direct our attention. That is not the condition in Eastern Ontario, nor in the Province of Quebec, because nearly all the butter made there is made on the separator system.

I am talking to western dairymen at the present time. Now the difference between the two systems in this : in the separator factory the maker has better control of the quality of the goods because he receives the milk perfectly sweet ; he skims the cream off ; he ripens it to suit himself ; develops the required flavor, and it is his own fault, in most cases, if he is not making a good quality of butter ; whereas, in the cream gathered factory, it is separated from the milk by the different farmers, and separated under different conditions, so that the buttermakers in these factories simply have to accept this cream in the condition it is delivered to him, and make butter of the best quality that he can out of it. You can easily understand that, with the conditions as they are at the average farm house, the milk being exposed to the atmosphere for a considerable length of time, it is very apt to be contaminated before it reaches the creamery.

Another disadvantage they have to contend with is that the cream is not collected very frequently, sometimes four times a week, sometimes three times, sometimes twice a week. So that you see that the farmers have the care of the cream, and in many cases it is not properly cared for. Why is not this cream-gathered butter improved to the same extent as is the butter made on the separator system ? One reason is, there has not been the amount of attention paid to it, although the revenue received from the butter made out of this system is far more than that by the other system. But for some reason or other the method of making butter by this system seems to have been sidetracked by in-

structors of dairy schools. Up to the present time the dairy schools have not taken this system of butter-making up, for the reason that they have not conditions under which they can teach this system. The condition of our dairy school, where we receive a quantity of milk and separate the cream from it and churn it, is altogether different from making the butter in a cream-gathered creamery, and the man who asserts that it is not, simply gives an exhibition of his ignorance of this system of making butter. I make that statement, and am prepared to prove it.

Another thing is the difficulty in reaching the farmers. You can understand that by collecting cream from a wide district surrounding a factory it is most difficult to come into contact with these farmers, and educate them as to the best method of caring for the milk and cream. How are we going to reach these farmers? The best method that I know is for the proprietor of the creamery to employ sufficient help, so that when the cream is not coming in in proper condition the butter-maker can return with the cream-gatherer to his home, and accompany him on his trip next day, when he will come into contact with the farmers and teach them a practical lesson on the best methods of producing and caring for the milk and cream.

Another method would be to call all the farmers together at an annual meeting, and employ some one to address them who could impart to them the knowledge they are in need of Some of the farmers in the north are adopting that system, and I am endeavoring to leave my work at the school and help them.

Mr. DERBYSHIRE: You want the farmers' wives there.

Mr. SMITH: I might say that is an excellent suggestion, and I have noticed that Mr. Petrie, in getting out the bills for the Holstein creamery, has especially requested the ladies to attend. How are we going to improve the quality of the butter made at these creameries if the conditions existing at the dairy schools are not favorable for teaching butter-making? Under these conditions how are we going to teach butter-makers?

When I visit these cream-gathered factories I am confronted with the statements that this Dairy Association is practically a cheese association, and is run by separator men, and that these cream-gathered butter-makers do not get a hearing, that they spend there money in coming here and nobody talks cream-gathered butter-making to them, and in that way they are not deriving the benefit they should. How we are going to improve the quality of the butter is to send an instructor to the creameries regardless of the application for services; send him there to do whatever good he can, then if he cannot improve the quality of the butter get some other man to go.

When you consider that these creameries are making an enormous amount of butter you can easily see what a great loss is suffered by the farmers of this country by not teaching the best methods for making it, and I think more attention should be paid to it. The separator system is at a standstill, it is going back, because each one of you who is intimately connected with the business knows that at the present time there are thousands of dollars worth of machinery at the separator factories standing idle. These cream-gathering creameries might be of much more benefit that they are. We see creameries in the north closing down when they are making five thousand pounds of butter in a week. Why is that? If these creameries in the winter time can make one thousand pounds in a week, and live and pay expenses of machinery, why do these creameries shut down when making five thousand a week? Simple because the farmers start feeding turnips. The price received for the butter is not sufficient to warrant them in keeping the factories in operation.

Another way to improve the quality of the butter would be by employing the right kind of cream gatherers We must have men to gather cream who are judges of the quality, and who are fearless in accepting or rejecting the cream, and who are willing to impart to the farmers knowledge as regards the caring of their milk and cream. We must endeavor to reach the farmers in some way or other and teach them the effect of the food given to the cow.

If we can demonstrate to the farmer, in a few words, that the food given to the cow is utilized for the production of blood, bone, muscle and milk, and if we can demonstrate to the farmer that the quality of the food given is secreted from the blood and is thereby affected; then we can demonstrate to them the reason it is affected; and if we can demonstrate to them that the more nutritious food they feed to the cows the more milk will be produced, I think it would help them greatly. These are all simple things, and if presented in a simple manner the farmer readily understands them.

I would like to devote a few minutes to the method of making butter by this method. In the separator system the milk is taken care of by the farmers. Now you can easily understand this difficulty of properly caring for large quantities of milk, and if it is delivered at the factory in proper condition the cost of hauling it to the factory is expensive, and the skimmed milk is not of as good quality for the dairymen.

At some factories the milk is pasteurized at other creameries it is not pasteurized, and in some cases the farmer will feed sweet milk one day and sour milk another. This deranges the stomachs of the calves and pigs ; by pasteurizing you overcome this difficulty to a large extent.

A MEMBER : Explain what you mean by pasteurizing.

Mr. SMITH : Pasteurizing means heating and cooling. It is a word derived from the name of a French scientist, Doctor Pasteur, who was one of the first to discover the science of bacteriology and place it on a firm foundation. Pasteurizing milk is simply heating it up to 150 to 170 degrees ; then by cooling it you prevent development of lactic acid. Now take the farmer producing cream for a cream-gathered factory. There are a great many hand separators being sold to these farmers. The larger patrons are adopting this method of separating cream from the milk, and it should be advocated by all means. The separator system extracts all the fat from the milk, and the farmers get cream of a better quality, and are better able to control the flavor. By skimming milk under the gravity system it has been proven that nearly a quarter of the fat in the milk is lost. You can readily understand that that is an enormous loss of fat. If a farmer had four cows, and he was losing the butter given by one cow he would think he was suffering a severe loss, and this is practically what he is doing now, so I advocate very strongly the use of hand separators For instance, a man has 200 pounds of milk. After he is through milking instead of setting this milk in deep cans or shallow cans, he runs it through the separator. It is all done in less than an hour. We will suppose that he has 20 pounds of cream instead of 200 pounds of milk. It is much easier to take care of the cream than it would be to take care of the milk. And instead of waiting till his skim milk comes back from the factory, and risking its not being in good condition for feeding to the calves, he has this warm skim milk there ready to feed. It has the animal heat in it and, by the addition of a small quantity of cotton seed meal or oil cake he will replace the butter fat taken out, and has practically as good a feed for the calf as if the fat were left in, so that the milk fed in this way must certainly be of much more value to the farmer. Now this man has 20 pounds of cream and the other man at the separator creamery has 200 pounds of milk. Which is going to cost the most to deliver ? You can easily see that the cream-gatherer can go out and collect as much cream to make 300 or 400 lbs. of butter in one day as a milk drawer can go out and collect a sufficient quantity of milk to make less than one third of that amount, so you see there must be a great difference in cost of supplying these factories ; you will readily see the difference is very much in favor of the cream gathering system.

Now, by educating these farmers as to how to properly care for their cream, and by delivering it at the factory in proper condition, we can make a quality of butter equal to that of the separator system. A butter maker must be a good judge of cream and know how to handle it in order to get the very best results. It requires a man of excellent judgment and of long experience ; no greenhorn can make butter on this system, and if we are going to improve the quality of the butter we must give more attention to it. We must educate these butter-makers as to the best methods of handling their cream, and in this regard I am a strong advocate of the alkaline test for acid. By the use of this alkaline test the maker can see in a very few moments the amount of acid on the cream. If the cream shows very little acid he will leave it at the higher temperature till it ripens. This cream drawn for a long distance is sometimes delivered at the factory in a heated condition, and has a heated smell, which some butter makers mistake for lactic acid, so they do not handle the cream so as to get the best results. Nor do they churn it at a low enough temperature to get an exhausted churning They also have a loss of butter fat and a loss in the quality. Now we must get to these makers and teach them how to handle these various kinds of cream. If a vat of cream comes in too thin a man must know when to ripen it. If we are going to have a better quality of butter in this country we must bend our energies to improving the quality of butter made at the cream-gathering creameries, and we must have an ideal to work to though we never reach it, because

when we reach the ideal we are working for at the present time, we will then have a still higher one, and for that reason we will never attain the desired end, but if we keep striving forward, we will in the end produce a great deal better quality of butter; bring more revenue into this country for the farmers, and bring the dairy products of this country before the eyes of the British people, and make it a great deal easier for us to dispose of our goods. There is great room to improve the quality of our butter.

In conclusion, let me say in the words of the poet:

Did ever on painter's canvas live,
The power of his fancy's dream?
Did ever poet's pen achieve,
Fruition of his theme?
Did marble ever take the life,
The sculptor's soul conceived?
Or ambition win in passion's strife
What its glowing hopes believed.

Mr. PAGET: I would like to contradict Mr. Smith, who said it had been charged to him that the Dairymen's Association of Western Ontario was run by separator and cheese men. Now, that is not the fact, and I would like to put Mr. Smith in a position to contradict that statement whenever it is made to him in the future.

Mr. BALLANTYNE: I remember a description given of what constituted a good cheese. At that time I never supposed I would be engaged in cheese-making to the extent I have been for the last 34 years A gentleman who was recognized as one of the best judges of cheese said, "A good piece of cheese should be firm without being hard; it should peel off like a piece of codfish; it should melt in your mouth, and leave a taste like a hazlenut." Now, let everyone of you examine this cheese (referring to the first prize cheese that had been cut up and was then being distributed to those present at the meeting) and see how near it comes to that character of a cheese. What was good cheese then should be good cheese now.

REPORT OF NOMINATING COMMITTEE.

The nominating Committee beg leave to report the following officers for 1901.

(For list of officers, see page 66).

Moved by M. R BROWN, and seconded by H. WHITE, that this report be adopted — Carried.

RESOLUTION OF SYMPATHY.

Moved by HAROLD EAGLE, seconded by JAMES CONNOLLY, "That this Association regrets exceedingly the absence from this Convention, owing to severe illness, of Mr. R. M. Ballantyne, the President of the Association. They recognize that he has given much thought and most careful consideration to proposals to raise the character of the output of our cheese factories, and to endeavor to solve some of the many problems the makers have to grapple with. This Association trusts that he may see his way to continue to act as President for the current year, though they know that, even if unable to act as an officer, his assistance, and advice will always be available."—Carried.

The CHAIRMAN: I am sure that we are all sorry to learn of Mr. Ballantyne's illness. We are glad however to know that it is not dangerous, and it is expected that he will be quite well at an early date. I am sure we all rejoice in that knowledge.

DIRECTOR'S REPORT.

Moved by J. CONNOLLY, seconded by J. N. PAGET, "That the annual report of the Directors as read at the first session of this Convention be now adopted as read".—Carried.

TRANSPORTATION AND FREIGHT RATES.

Moved by ROBERT JOHNSTON, seconded by J. N. PAGET, "That the manufacturers of cheese and butter in Western Ontario in Convention assembled at the Annual Convention of the Dairymen's Association of Western Ontario request their Board of Directors to represent to the several transportation companies through their chief officers:

"1st. The extent to which they are handicapped in their business as manufacturers of cheese and butter by the extreme rates charged by the railway companies from the outlying points in the districts in which Ingersoll, London, Woodstock, Listowel and Brantford are the market centres.

"2nd. That the rates charged from some of these outlying points to the Seaboard are exorbitant.

"3rd. That in the opinion of this Association the rates should be somewhat in proportion to the distance the freight is carried, the rates from Chicago to the seaboard being in many cases as low as from places in the above mentioned districts.

"4th. That the cars provided for transportation of cheese and butter from factories to the seaboard are often so very dirty as to be quite unfit to carry either cheese or butter in

"5th. That the supply of double-lined and ventilated cars is quite insufficient for the requirements of the dairy industry.

"And to request such transportation companies to give their serious consideration to these matters, with a view of endeavoring to give better rates of freight and a more ample supply of cars suitable for the purposes of carrying cheese and butter."

Mr. PAGET: In seconding that motion I beg to say that I think we have just cause to address the transportation corporations of this country. I think we have suffered unjustly. That is recognized by all the men who are engaged in the trade to-day. When freights are high the costs come from the producer. The farmer has to pay it in the end. The Honorable the Minister of Agriculture refers to these transportation companies as hard hearted, but he also said that when they are properly approached they are reasonable. I think in making this request we are making a very reasonable one, and I hope the words of the Minister of Agriculture will come true. Carried.

FURTHER CHEMICAL INVESTIGATION INVITED.

Moved by A. T. BELL, seconded by I. W. STEINHOFF, "That this Association is of the opinion that the appointment by the Department of Agriculture of Ontario of a chemist should be made for the purpose of conducting chemical investigations by which many of the problems connected with the manufacture of cheese and butter can be solved; also that steps should be taken to provide for a close co-operation between the chemical and bacteriological investigators and the men practically engaged in the manufacture of cheese and butter, and that a copy of this resolution be transmitted to the Honorable the Minister of Agriculture of Ontario."

Mr. A. T. BELL: I might say that it has been felt for some time that cheese and buttermakers require more help in this line, and if the appointment is made, which I earnestly hope will be, it will be the means of lifting the cheese and butter trade to a higher level. We want more scientific knowledge in our business. Carried.

After a vote of thanks to the 1st and 2nd Vice Presidents, who had occupied the chair in turn at the meetings, the Convention adjourned by all singing "God Save the Queen."

DAIRY SCHOOLS OF ONTARIO.

AGRICULTURAL COLLEGE DAIRY SCHOOL.

H. H. Dean, B.S.A. ..... Professor of Dairy Husbandry.
G. H. Barr and R. W. Stratton ..... Instructors in Cheese-making.
Mark Sprague ..... Instructor in Separators and Piping.
Jas. Stonehouse ..... Instructor in Butter-making.
J. A. McFeeters ..... Instructor in Milk-testing.
T. A. Wiancko... Instructor in Separators and Milk-testing in the Farm Dairy.
Miss Laura Rose ..... Instructress in Butter-making in the Farm Dairy.
Prof. F. C. Harrison ..... Instructor in Dairy Bacteriology.
R. Harcourt, B.S.A. ..... Instructor in Dairy Chemistry.

In 1900 there were 84 students registered. Of these, 23 were ladies. Two of the ladies took the Factory Course, and 21 took the Farm Dairy work. Of the men students, 35 took the Factory Course, 22 registered for special work in Butter-making, 3 for special work in Cheese-making, and 24 for the Farm Dairy. Of these students, 45 wrote on the final examinations, which were held on the 22nd and 23rd of March. 25 wrote on the Factory Course work, 9 on Butter-making, 11 on Farm Dairy.

During the year the following counties, cities and districts in Ontario were represented: Brant, Bruce, Dundas, Durham, Dufferin, Elgin, Grey, Grenville, Glengarry, Halton, Huron, Lanark, London, Leeds, Muskoka, Middlesex, Norfolk, Ontario, Perth, Peterborough, Toronto, St. Joseph's Island, Waterloo, Wellington, Wentworth, York.

Outside of the Province of Ontario, there were students from Manitoba, North-West Territories, British Columbia, Quebec, England, and one student from Sweden, in Europe.

The experience of these students ranged from nothing to eight seasons at Cheese-making and Butter-making.

Diplomas were granted to five students in Cheese-making and five in Butter-making.

The lectures given during the term were as follows: 40 lectures on Dairying, 2 lectures on Agriculture and the Swine Industry in relation to Dairying, 3 lectures on Veterinary, 3 lectures on Biology, 4 lectures on Chemistry relating to the Dairy, 6 on Bacteriology, 2 lectures on the best varieties of grain, grasses, clover, etc., 2 lectures on the Factoryman's Fruit Garden, and how to improve the surroundings of the Cheese Factory and Creamery. There were also given 8 lectures on Mathematics and Book-Keeping as required in the Dairy. The Farm Dairy Class spent one afternoon of each week at practical work and lectures in the poultry houses, which proved very beneficial to these students.

The supply of milk for practical work was somewhat limited. We have considerable difficulty in securing the proper amount of milk for our students to work with. During the three months of January, February and March there were delivered at the dairy 264,530 pounds of milk. The average daily delivery was 3,624 pounds. During the month of December for our Creamery Class and for the second year students of the College, there were manufactured into butter 43,153 pounds of milk, the average daily supply being 2,397 pounds. This milk was supplied by 42 patrons, exclusive of that produced by the dairy herd. The dairy herd supplied to the Dairy School during the four months, 54,423 pounds of milk, or over one-sixth of the total milk that was used by the students.

For the year 1901 we have added two special features for our dairy students. These features are a course of practical work in the laboratory relating to dairy bacteriology and a practical course in dairy chemistry. The course in dairy bacteriology is about as follows:—

1. *Bacteriology.*—Students study the bacterial contamination of milk from the fore-milk, from the animal, the milker, from the air, and from badly washed cans. There will also be experiments in illustrating the influence of temperature on germ life as found in the dairy.

2. *Fermentations.*—By means of pure cultures the following fermentations of milk are demonstrated to the students: Lactic, butyric, gaseous, bitter, slimy, alcoholic, and colored. They will also be given instruction on the action of disinfectants, and the best ones to employ for stable, factory and dairy.

3. *The Preservation of Milk.*—The characteristics of normal and heated milk are first studied followed by determination of the germ content of the milk, skim-milk, whey, etc. Tests of pasteurizing machines for factories, and the benefits to be derived from the use of these, will also be made.

4. *Butter.*—The preparation of cream and starters. The propagation of starters. The effect of different germs on the flavor and other qualities of butter. The faults of butter, such as putrid, bitter and off-taste will also be demonstrated in the laboratory.

5. *Cheese.*—The propagation of cultures or starters for cheese-makers, the study of gassy and other injurious fermentations, and a general study of the change in the ripening of cheese, and the effect of temperature on the ripening.

The Dairy Chemistry will consist of 10 lessons:—

1. Lesson on the use of the chemical balance.
2. Determinations of the specific gravity of milk, skim-milk, butter-milk butter fat.
3. Determination of the melting point of butter and oleomargarine.
4. Making a normal alkaline solution.
5. Use of the normal alkaline solution, and determining the acidity of milk and cream.
6. Butter analysis. Determination of water, fat, casein, ash, and salt.
7. Milk and cheese analysis. Determination of water, fat, casein, albumen, sugar, and ash.
8. Detection of preservatives in milk.
9. Testing the purity of butter by determining the amount of volatile acids present.
10. Testing the purity of dairy salt.

Very little advance appears to have been made in overcoming the troubles of the cheese-maker and butter-maker during the past five years, and to the dairy bacteriologist and the dairy chemist we must look for help to overcome the rapidly multiplying difficulties and dangers of the dairy industry. This course of practical work in the bacteriological laboratory and in the chemical laboratory will materially assist cheese and butter makers in overcoming the bad flavors which are becoming too common in our cheese and butter. All cheese-makers should avail themselves of the help science is able to give them in reference to bacteriology and chemistry as applied to the dairy.

For 1901 we are giving a special short course in February to experienced makers, and to those who have already taken the Dairy School Course. We cannot accommodate more than 25 students in this course, and we hope to see that number take advantage of this opportunity given them to know more of the science of dairying.

H. H. DEAN,
Superintendent.

GUELPH, Jan. 28, 1901.

EASTERN DAIRY SCHOOL.

J. W. HART.....Supt. and Instructor in Cream Separating.
G. G PUBLOW.....Instructor in Cheese making.
L. A. ZUFELT.....Instructor in Milk-testing.
W. A WILSON.....Instructor in Butter making.
THOS. PERRY.....Assistant in Cheese-making.
C. A. PUBLOW.....Assistant in Butter-making
JAMES NOBLE.....Engineer.
W. T. CONNELL, M.D.....Bacteriologist.

The following is a report of the Kingston Dairy School for the year ending Dec. 31st, 1900:—

The cheese and butter makers of Eastern Ontario have been keenly alive to the benefits of attending the school, and all the classes have been well-filled. From January 1st to April 7th 98 students were registered. On the 14th of April the school was closed for the season; classes were resumed on the 4th of December and 29 students registered, making a total of 127 for the year.

The attendance by Counties in Ontario and from places outside of the Province was as follows: Lanark 20, Leeds 17, Carleton 12, Lennox and Addington 9, Peterboro 8, Renfrew 8, Frontenac 7, Grenville 7, Stormont 7, Dundas 6, Hastings 6, Glengarry 5, Durham 3, Prescott 2, Prince Edward 2, Quebec 3, North West Territory 1, Prince Edward Island 1, New Zealand 1, United States 2

It is a gratifying fact that many of the students who have attended the school in 1900 have been here in previous years. In fact some of them have attended the school for three or four years in succession, and consider that their time and money have been well spent. These students who are keeping themselves posted in modern methods of manufacturing butter and cheese are prepared to take up work of a higher grade than those who have attended the school for the first time, and we should be able to furnish them the facilities for a wider and more thorough knowledge of the principles underlying the art of dairying. The more extended work in dairy bacteriology is much appreciated by the students, especially by those who attended the school in the early years of its history. In studying these minute forms of vegetable life a new world is open to the student. The practice a student gets in such work as preparing media and inoculating the same with cultures of different germs, is valuable in impressing upon him the need of absolute cleanliness, and it is noticeable that the students that are the most proficient in their bacteriological work, are the ones who are able to prepare and perpetuate starters without that degree of contamination experienced by men who lack this training.

The time has come when the instruction in dairy chemistry might be extended. Those students who attend the school from year to year do not need so much of the actual routine work of butter-making and cheese making, and they have time at their disposal that they could profitably spend in studying the scientific side of dairy work. Again the investigations that they might undertake would be intensely practical and applicable in their every-day experience in a factory. To tell a student that there is 13 per cent. of solids in milk is one thing, but to teach him to approximately calculate the same by means of the lactometer and Babcock test will impress the idea upon his memory, and is placing within his reach information invaluable in this business. If in addition the student could take samples of milk and evaporate the moisture, thereby more or less accurately determining the percentage of solids, he would get a better grasp of the subject, besides having the advantages of increased skill and precision which the manipulation of a chemical balance would give him. There are a number of other points to which he could with profit devote considerable attention, such as ash determinations in milk, fat extraction, the preparation of standard alkaline solutions, and the analysis of cheese and butter. Not only would this work prove valuable to him from a pracical standpoint, but this subject would be a valuable discipline for the mind.

The practical work of the school is organized in two separate divisions, cheese-making and buttermaking; milk testing and bacteriology are taught in both. Factory methods and management alone receive attention; no facilities being afforded for home dairy work. Granolithic floors have been laid in the butter department. With a large attendance of students the school is very much crowded, and but for the limited space at our disposal, we would have other machinery which is found in well-equipped dairy schools. This is specially true in butter-making, as cases are occurring where men do not attend the school, but prefer to go in some creamery because we cannot give them the practice they want in running machinery they are expected to handle in their creameries.

Respectfully submitted,

J. W. HART,

Kingston, January 23rd, 1901. Superintendent.

WESTERN DAIRY SCHOOL.

Archibald Smith	Supt. and Instructor in Butter-making.
John Brodie	Instructor in Cheese-making.
Geo. E. Goodhand	" Cream Separators.
Frank Herns	" Milk-testing
James Bristow	Assistant instructor in Butter making.
Miss Bella Millar	Instructress in Home Dairy.
Dr H. A. Stevenson	Bacteriology.
Dr J. P. Whitehead	Veterinary Science.

The Western Dairy School was closed during the summer of 1900, but reopened on December 3 for a special creamery course of three weeks duration. This course was for

the benefit of students wishing to make a special study of butter-making, and who had not the time to take the long course.

One of the special advantages of this School is the large amount of milk and cream handled each day. About 5,000 pounds of milk is received daily, and also the cream from a skimming station, making it possible for the students to learn butter-making as it is carried on under factory conditions.

The present year has been the most successful in the history of the school. In all forty-eight students have been in attendance of whom four were graduates of other Dairy Schools. Many of the students have had several years experience, the average experience of the whole number being five years. The majority of them took the whole course, as did also those who took the special creamery course.

They are given theoretical and practical instruction in cheese-making and the curing of cheese; butter-making (both separator and cream gathering plans), and the preparation of butter for market; pasteurization of whole milk and cream; care and ripening of pasteurized and raw cream; use of the acid test for cream; running of box churn, both Victor and Simplex combined churn and worker and the Mason worker; milk testing with the Babcock tester and lactometer, and the oil-test churn which is so much used in cream-gathering creameries. They are also given instruction in fermentation tests, the use of starters, dairy bacteriology, agriculture in relation to dairying, the diseases and treatment of dairy stock, and factory records and accounts. A number of experiments in cheese and butter making were carried on for the purpose of demonstrating to the students the results of different methods of making. Some time is spent each week judging cheese and butter. This is a great advantage to students in teaching them to know when they have produced a good article, and also in what respect their butter or cheese is especially good or bad.

The study of bacteriology, which is so important a factor in the dairy industry, was taken up in a practical way. An incubator was purchased for the purpose of developing germ life. The students were allowed to inoculate the test tubes and to propagate different varieties of bacteria, and afterwards to examine them under a microscope. In this way they obtained much valuable information on results of carelessness in care or handling of milk and its products.

The Home Dairy Department is each year becoming more popular. More farmers' wives and daughters are attending, and are being practically benefitted by even a short course. They are beginning to feel that they need more scientific knowledge along this line in order to make dairy butter successfully.

In January a Literary Society was organized among the students, and has been found exceedingly helpful in training them to speak before an audience. Debates and impromptu discussions were probably the most beneficial.

A special feature of this school is the holding of monthly meetings of the farmers and dairymen of the district in the Dairy School. Able and practical speakers are secured from a distance to address them on agriculture, dairying and kindred subjects. This year these meetings have been very successful, the lecture hall being taxed to its utmost capacity to accommodate the audience. They are much appreciated by the farmers and dairymen who attend as they are greatly benefitted by them. This is one of the best means of reaching the farmers and educating them in the production of a better quality of milk for our cheese and butter factories and in modern and up-to-date methods of dairying.

Inquiries and applications have been received from various parts of the Province for practical cheese and butter makers to take charge of factories or act as helpers. The students attending the school were all provided with good situations, and many more could have been placed in good positions.

The School closes for this term on March 30th.

ARCHIBALD SMITH,
Superintendent.

STRATHROY, March 2, 1901.

ANNUAL REPORTS

OF THE

LIVE STOCK ASSOCIATIONS

OF THE

PROVINCE OF ONTARIO

1900.

DOMINION CATTLE BREEDERS' ASSOCIATION.
DOMINION SHEEP BREEDERS' ASSOCIATION.
DOMINION SWINE BREEDERS' ASSOCIATION.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
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1901.

WARWICK BRO'S & RUTTER, Printers

TORONTO.

ANNUAL REPORT

OF THE

LIVE STOCK BREEDERS' ASSOCIATIONS

1900.

To the Honorable the Minister of Agriculture :

I have the honor to submit herewith the Annual Reports of the Dominion Cattle Breeders' Association, the Dominion Sheep Breeders' Association, and the Dominion Swine Breeders' Association.

Your obedient servant,

A. P. WESTERVELT,
Secretary.

CATTLE, SHEEP AND SWINE ASSOCIATIONS.

REPORT OF THE SECRETARY.

My annual report, as heretofore, includes a summary of the work for the year, of the Cattle, Sheep and Swine Breeders' Associations. These associations are annually becoming more influential and their work is increasing in importance. The work done is being more closely scrutinized each succeeding year, and while more funds have been placed at our disposal from year to year, better work is expected of us and more of it. The more work we do, the more we are expected to do. As representing the live stock interest, a broad view should be taken of the work of the Association, and the objects sought should be, first, what will increase the quality of our stock, and, second, how afterwards may the highest market price be procured for the produce we have for sale? It should be borne in mind that anything done along these lines is a direct benefit to the country at large While the work of the associations is apparently in the interest of breeders of pure stock, it is but a means to an end, because the pure-bred stock of the country has a direct influence on the stock raised by the rank and file of the farming community. Any work which is of benefit to the breeders of pure-bred stock is, therefore, of benefit to all breeders and feeders, and the work of the associations should have the co-operation and receive the hearty support of all persons who may be interested in the live stock industry.

The educational work in connection with the Winter Fair has been undertaken for the purpose of giving such instruction as will fix in the minds of breeders and feeders the ideal animal suitable for the best markets, as well as the study of the principles of breeding necessary to produce such animals and how best to care for and feed in the best and most economical manner.

The following is a brief summary of the most important work accomplished by our associations the past year :—

1. Lists of expert judges nominated, printed and supplied all fair managers.

2. Appointment of delegates to Fair Boards to look after the interest of the live stock exhibit at the larger Fairs in the Province. Last year was the first year the representatives of the cattle breeders' associations were allowed membership in the Toronto

Industrial Association. In the draft for reorganization, the following is the representation in the Toronto Industrial Association :—

Dominion Cattle Breeders' Association, two delegates.

Dominion Sheep Breeders' Association, two delegates.

Dominion Swine Breeders' Association, two delegates.

3. The annual report for 1899, consisting of an issue of 22,000, was placed in the hands of each member of a live stock association and of a farmers' institute throughout Ontario. In it was printed a full report of lectures delivered at the Winter Fair, London, and the essays and statements supplied by the various exhibitors.

4. In the matter of transportation, shippers of registered stock between local stations in less than car lots are able to ship their stock at the reduced rate of one-half the regular tariff, upon compliance with the regulations of the railway companies. Pure bred stock was shipped to the West as often as a car-load was available. There were twelve cars shipped. In these cars enough horses to about fill one car were taken to the West. While this part of our work is of great assistance to the buyer in the West and the seller in Ontario, there is one great drawback, that is, the uncertainty as to when a car will be shipped The rate to British Columbia is now much reduced, the rate to New Westminster being $150 for an ordinary car and $225 for a palace horse car 50 feet long, which will accommodate one and a half times as much stock. The rate is $175 to the boundary country, where a part of the route is by water. In 1898 the rate on an ordinary car of stock was $251. This will mean that a much larger portion of the stock used in British Columbia will be purchased in the Province of Ontario instead of being brought in from the States to the south. Three cars of stock have already been shipped to British Columbia this year.

I wish to again impress the advantage of shippers making themselves thoroughly familiar with classification of weights and the number of railway circulars governing rates and the dates of issuing. Agents at small stations are very often not as familiar with their circulars as they should be, and much trouble would frequently be saved if shippers would make it their business to see that their agents keep informed as to the latest regulations regarding the shipment of pure-bred stock. When a new circular is issued, a copy of it will be found printed in the Agricultural Gazette. Should the agent refuse to comply with any regulation, the matter should at once be laid before the district or general freight agent, who will have the matter adjusted. When any overcharge is made, before a refund can be obtained it is absolutely necessary to produce the original receipted shipping bill. The secretary representing the associations is perhaps in a better position to take these matters up than persons individually are, a number of refunds having been made the past year after a first refusal by a company. This is an example of the result of having an organization whose good will corporations consider it their interest to cultivate. A circular is now being issued by the Live Stock Commissioner and the live stock associations, covering the railway regulations and rates between points in Canada.

The following committee: Hon. John Dryden, F. W. Hodson, Robert Miller, Arthur Johnston, William Linton, H. Wade, Dr. Andrew Smith, and Peter Christie, waited on the Traffic Managers of the Canadian Pacific and the Grand Trunk Railways, and made arrangements for the passenger and freight rates to the auction sales. The Traffic Managers also agreed to transport registered horses between local points at the same rates as registered cattle sheep and swine, and to grant a rebate on the passenger fare to anyone purchasing a carload of stock in Ontario.

5. The lists of stock for sale by members of the associations have been published monthly in the Agricultural Gazette. All members of the associations do not seem to realize how much sought after and how closely these lists of stock are scanned by those wishing to purchase. The last list, however, published on January 23, shows what value is attached to it by a large number of breeders.

6. The Farm Help Exchange is doing a good work, and by the number taking advantage of it, it can readily be seen in what estimation it is held. During the past year 360 advertisements have been inserted. This, while adding considerably to the office work, is, I believe, one of the best means we have of drawing attention to the work of our associations. The associations are in such a position to-day, and I believe are doing such good work, that the more prominently their work is brought into public notice, the better it will be for the associations and for the live stock interests generally. The Agricultural

Gazette is now well established as the official organ and mouthpiece of the live stock associations. Our work in this direction should be pushed vigorously, and your Secretary should be instructed to use every endeavor to make this organ such that it will in the truest sense be the centre and represent the most advanced thought in regard to matters of interest to our live stock trade.

Stock Purchased. This is yearly becoming a more important part of the work of the associations, fulfilling commissions for persons outside of the Province, including the Governments of the Northwest Territories and British Columbia. Last spring three carloads, including two hundred sows and twenty-five boars, were purchased for the Northwest Government, and were sold by auction at the following points:—Calgary, Olds, Red Deer, Lacombe, Wetaskiwin, Le Duc, and Edmonton.

These cars were transported free by the Canadian Pacific Railway. The object of the Northwest Government was to import a more improved class of swine into the Territories, and have them distributed in the districts in which it was considered advisable to encourage and foster this industry. It is expected that this work will increase the demand for stock in these districts. The cost of the shipment was practically covered by the prices obtained at the sale One feature was demonstrated, that when a reserve bid was placed on an animal, buyers considered they had bid the full value of the animal when the reserve bid had been reached, and, as a general thing would bid no further, while in the case of as good an animal, perhaps, but no better, put up without reserve, the bidding would go much higher.

Last fall a mixed carload of stock was purchased for British Columbia. A palace horse car was used and was well filled. This shipment was so successful that a second sale is to be held in British Columbia under Government auspices, on March 12, at which twice as many head of stock will be sold.

Four carloads of stockers were purchased for a Western buyer.

Provincial Winter Fair. The Provincial Winter Fair of 1900 was by far the most successful held under the auspices of the live stock associations. At the last annual meeting it was decided that the work of the winter fair could not be conducted so as to derive the most good unless permanent buildings, properly fitted, were provided. Definite offers to erect a suitable building were made by the cities of Guelph and Brantford, and that of Guelph was accepted. During the past summer and fall a fine stone building was erected, and, while not entirely completed, it was in fairly good condition for holding the show. The building on the ground floor covers an acre of ground. The fittings provided by a special appropriation of the Legislature for that purpose, include a special apartment for the dairy cattle, a lecture room, a room for hanging the carcases, a boiler room and a killing room. The dairy stable, the lecture room and offices and the poultry building are comfortably heated. The hanging room is supplied with tracks and travellers, so that the carcases can be easily transferred from the killing room to the hanging room, and from there to the lecture room, when required. The killing room is provided with proper appliances, and for heating purposes a 72 horsepower boiler is supplied, capable of heating the entire building, should it at any time be thought advisable to do so. The building is lighted throughout with electric light. Seating accommodation is provided around the cattle show ring. The lecture room was found to be inadequate, and although it will be impossible to provide accommodation for as large a number as wish to attend, an appropriation is provided so that the seating capacity can be almost doubled by taking out the two small rooms between the lecture room and the cattle ring. Provision will also be made so that the feed can be stored in the centre of each double tier of pens, by running an extra hurdle down the centre, and taking about one and a half feet off each pen. This will add a great deal to the general appearance of the building another year. The building outside will another year present a better appearance, as it will be completed and nicely painted. A great deal of credit is due to the city and county, and the societies and townships contributing towards the erection of this building As for the show itself, the number in attendance testifies to the popularity of this institution. It is an evidence that in order to get a good attendance, it is not necessary to provide "attractions." It is a hopeful sign to see the anxiety to learn, as shown by the interest taken in the demonstration lectures. This was the first amalgamated show of the Provincial Fat Stock and Dairy Show and the Ontario Poultry Show, now known as the Provincial

Winter Fair. The poultry department was quite a centre of attraction. There were over 2,000 entries in the department. The dressed poultry exhibit showed a much better quality than the previous year, but was not so large as it should have been.

Thirty-four of the farmers' institutes took advantage of the privilege of having their members admitted free to the show. This is practically 50 per cent. of the institutes in western Ontario. There were about 1,600 admitted on these tickets. While this was not a great source of revenue, it was the means of inducing a large number of the masses to come to the show from outside districts, and it is by doing this and giving them something of value when they get there, that the expenditure of the money spent in carrying on this work is justified. Outside of these members of farmers' institutes, it is estimated that about 10,000 persons visited the fair. The receipts for admission amounted to $1,152.70. The free admission swelled the attendance, which is what we want, and I believe it good policy that it should be continued. I would suggest, however, that for the five dollars, the admission allowed any one institute, be reduced to one hundred, and that an additional five dollars be charged for each additional hundred admitted free from any one institute. Our policy in connection with the Winter Fair should be to add to the quality of the exhibits rather than to the quantity, to increase the attendance, and to obtain the best possible instructors and lecturers. If necessary, some expense should be incurred in this connection.

All the delegates appointed to address farmers' institute meetings during the season 1900 01 were present at all the meetings. A number of representative agriculturists from the Maritime Provinces were brought to Guelph by the Live Stock Commissioner. It would be well if next year similar arrangements could be made with respect to representatives from western Canada.

Annual Auction Sales. At the last annual meeting it was decided to commence the work of conducting annual auction sales. A committee was appointed, and sales are now arranged to be held at Guelph on February 27th, and at Ottawa on March 6th. There will be about 100 cattle offered at each sale, and from 25 to 30 pigs. Fifteen thousand circulars have been sent out to persons interested, and advertisements have been placed in *The Farmers' Advocate*, *The Farming World*, *The Weekly Sun*, *The Globe*, *The Mail*, *The Nor'-West Farmer*, *The Calgary Herald*, *The Medicine Hat News*, *The Breeders' Gazette* and *The Co-operative Farmer*, Sussex, N.B. The work is well in hand by the committee, and all arrangements are practically completed. It is hoped that each member of the live stock associations will do all in his power to assist in bringing to a successful issue this very important work. The rules have been given a wide distribution, and have been framed to best protect the interests of both buyer and seller. Successful sales will be a benefit to all breeders of stock—whether a large breeder or a breeder of only a few head—and will be a benefit to the live stock trade generally. Each breeder should look on their success as a personal matter, and should make every effort to push ahead this portion of the work of the associations.

Cattle and swine only will be offered at the above sales. It was decided that a sale of sheep could best be conducted in the fall of the year.

Cattle Breeders' Association. The affiliation of the Shorthorn Breeders' Association, the Holsteins Breeders' Association, the Jersey Breeders' Association and the Canadian Ayrshire Breeders' Association with the Dominion Cattle Breeders' Association is a source of strength to our cattle industry. The commercial work to be done for the general advancement of the live stock industry of this Province can be better done by one association, representing all the breeders of all the breeds, than by any one association representing but one breed, no matter how strong in numbers that association may be. Members of the above association, by affiliation, are entitled to the full privilege of membership in the Dominion Cattle Breeders' Association, to advertise their lists of stock for sale monthly in *The Gazette*, and to free admission to the Provincial Winter Fair. The live stock associations now represent an organization of about 2,000 breeders, and are in a position to demand any rights to which they are entitled.

Association Cars for the West. One hundred dollars has been appropriated by the Dominion Shorthorn Breeders' Association, and $50 by the Horse Breeders' Association, to assist in paying the wages of a man in connection with these cars. At the suggestion of the Live Stock Commissioner, I believe it would be well if arrangements could

be made to ship these cars at advertised times. It would be of a great deal of service to sellers and buyers, as each would know exactly when an animal could be shipped. If more stock were offered than could be shipped in one car, a carload could be shipped earlier, and a second at the advertised time. It might be necessary sometimes to ship a car without being entirely filled, but the slight expense incurred would be far overbalanced by the convenience and advantage to buyers and sellers in knowing the time at which an animal could be delivered. I believe a car could be safely advertised each year for January 15, February 15, March 15, April 15, May 15 and October 15.

Following is a list of pedigrees and transfers recorded in 1900 :

Berkshires	1,260
Yorkshires	1,466
Chester Whites	270
Poland Chinas	74
Tamworths	432
Duroc-Jerseys	37
Essex	18
Total	3,558

Volume ten was published and sent to members for 1899. Volume eleven, containing a full list of pedigrees registered in 1900 will be issued within a week and will be placed in the hands of members for 1900. At the last annual meeting it was decided to print the volume of the Record quarterly, to issue the certificates as at present, but to shorten the printed form. At a meeting of the Executive it was decided for 1900 to print the volume as formerly, six months of the year having elapsed. In order that a saving may be made in the cost of printing I would suggest that the swine record be issued quarterly, that 2,000 copies be issued instead of 400, and that advertising be inserted in the back of each publication. In enlarging the issue to 2,000 the value of the publication as an advertising medium would be increased, and free copies could then be placed in the hands of all live stock associations, Agricultural and Experiment Stations and agricultural papers throughout Canada and the United States. It would be an advantage to the association and to the swine industry of the country to have the Swine Record in the hands of all these institutions. The cost would be materially reduced. More benefit would be received from the publication. It would be an advertisement of the association and of the breeders wherever placed. This, together with the additional grant of $500, should this year place the association in a good position financially.

Premium List of Winter Fair. In issuing the prize list during the last two years, 2,000 copies have been issued. Special prizes were solicited, and any person giving a prize was allowed a page advertisement, and permitted to make an exhibit at the show. At the last show space was taken up by these exhibits, which could have been put to better use for the purpose of the show if occupied by the live stock exhibit. This year I would suggest that 10,000 copies of the prize list be issued, and advertising inserted. I believe that $300 in cash can be easily made in this way, over and above the cost of printing, and the room occupied by the exhibit of special prizes will be available for other purposes.

The general admission to the show should be : Gentlemen, 25 cents ; ladies, 10 cents ; children under twelve, 10 cents.

Lectures. A great deal of attention should be given to the lectures on live stock. This is one of the most important and popular features of the show. Care should be taken to get the very best men to talk on the various subjects, even if it is necessary to incur some expense in doing so. This is an important department which it is necessary to keep improving, and it should be made as thoroughly practical and useful as it can possibly be made. To assist in this work the Dominion Department of Agriculture have agreed to bear the expense of procuring lecturers and having them make special preparation.

Payment of Judges. I would suggest that the Judges be paid ten dollars for their services at the Winter Fair, upon receiving from each one a report for publication on the classes over which he adjudicated, and it would be well to consider the advisibality of appointing but one judge in place of two.

TEN PER CENT. ADDED TO PRIZES. Instead of this amount being given for statements of feeding after the show, I believe it would be in the best interest of the work to have these statements given before the show, so that they could be made use of at the show by the lecturers. I suggest that they only apply to animals to be shown in the dressed carcass competition, and that this statement be given before an animal be allowed to enter in this competition.

DRESSED CARCASS COMPETITION. In the dressed carcass competition in the pure bred classes the name and number of the animals should be given at the time of making the entry, and in the grade classes a distinctive name should be given. This is necessary in order to make a comparison of the prizes won alive and as dressed carcasses. I suggest that in the competition of dressed carcasses in the cattle department for 1901, the pure breds show together, and a class for grades be added, and that the prizes be as follows:

Section 1.—Pure breds.—1st, $50; 2nd, $30; 3rd, $20; 4th, $15.

Section 2.—Grades and crosses.—1st, $50; 2nd, $30; 3rd, $20; 4th, $15.

It would also be well to limit the competition to steers under three and heifers under three.

SHEEP PRIZES. It would be well to consider the advisibility of confining the dressed carcass competition entirely to wethers. When ewes and wethers are shown in separate sections when alive, it is impossible to make a comparative statement of prizes won alive and as a dressed carcass if ewes and wethers are shown in the same section when dressed.

SWINE PRIZES. At the last meeting of the Board of the Winter Fair it was by motion suggested that the prizes for bacon hogs be offered as follows, a section for pure breds and a section for grades. The prizes for bacon hogs both alive and dressed might then be as follows:

Section 1.—Pure breds.—1st, $30; 2nd, $27.50; 3rd, $25; 4th, $22.50; 5th, $20; 6th, $17.50; 7th, $15; 8th, $12.50; 9th, $10

Section 2.—Grades.—1st, $20; 2nd, $15; 3rd, $10.

Sweepstakes.—1st, $15; 2nd, $10; 3rd, $5.

DISPOSAL OF CARCASSES Arrangements should be made to have all carcasses entered in the competition put up at auction the last afternoon of the show.

DAIRY TEST The rules governing the dairy department should be left in the hands of the dairy committee for revision.

SUMMARY.

The special work of the association this year should be: (1) To push the auction sales. (2) To co-operate with the Live Stock Commissioner in developing inter-Provincial trade. (3) To push and make as valuable as possible the educational features of the Winter Fair. (4) To arrange for the live stock exhibit at the Pan-American Exposition. (5) To develop The Agricultural Gazette.

DOMINION CATTLE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The Annual Meeting of the Dominion Cattle Breeders' Association was held in the City Hall, Guelph, February 28th, 1901, at 4 p.m., the President, Mr. Richard Gibson, in the chair.

On motion, the minutes of the last annual meeting were taken as read.

JOHN BRIGHT moved, seconded by Major MCGILLIVRAY, "That the report of the Secretary be taken as read and adopted." Carried

The Financial Statement was read by the Secretary-Treasurer and adopted.

FINANCIAL STATEMENT.

RECEIPTS.	
Members' fees	$ 578 50
Legislative grant	2000 00
	$ 2578 50

EXPENDITURE.	
Balance due Treasurer, as per last report	$ 239 90
Prizes, winter fair	1463 11
Officers' salaries	200 00
Directors' fees and expenses	69 45
Postage and stationery	72 63
Printing	51 97
Periodicals for members	130 76
Cost of reporting	5 25
Miscellaneous,—	
Typewriting and office work	202 57
Telegraph, telephone, express and cartage	26 82
Auditor	5 00
Cleaning office	2 05
Balance stock car account	22 98
Expense, 1899, in connection with investigating alleged fraud, re shipment of stock to the west	8 33
	$ 2500 82
Balance on hand	$ 77 68

RICHARD GIBSON, President.
A. P. WESTERVELT, Treasurer.

Examined and found correct, this 20th day of February, 1901.
J. M. DUFF, Auditor.

PRESIDENT'S ADDRESS.

BY RICHARD GIBSON, DELAWARE, ONT

Allow me to welcome you to our meeting, and while I do so it is with mingled feelings of pleasure, anticipation, and regret. Pleasure, inasmuch as I am allowed to announce through the Secretary, the wonderful increase of membership, and prosperity ensuing therefrom I shall not occupy your time anticipating that report; it is simply wonderful in its figures, and we trust the results may be the same, and that every member will say from conviction and from the bottom of his heart, "'Twas a good day when I joined." What are we here for? To legislate in a legitimate manner for the best interests of cattle of large or small degree, for dairy as well as for beef. It is the only legitimate combine with which I am acquainted, that I have read, dreamed or heard of that was not paid for services, or did not water their stock from a financial point of view. Of course we all water ours, and it has been cruelly said the dairyman's best cow was the one with a stiff tail. When young I was a dairyman myself, and I will not lie. I will admit nothing.

But what are we here for? At the late Cattle Breeders' meeting at Salt Lake City, Utah, President Springer, in his inaugural, said, as quoted: "We represent on this plat-

form and under this roof, three hundred billions of money. More than the produ e of all the mines of coal, iron, gold or precious stones, of all the looms, of all the produce of the forests, of the fisheries, and if we make our wants known and have our demands satisfied, we can change the policy of any administration or upset any party." I am not repeating these words to inflame your minds, I am not doing it as a menace to any, but I do wish to congratulate you all upon the powerful weapon the weakest of us hold when in combination : "With unity there is strength." Let us all, then, meet harmoniously, leave our petty troubles to a lower court of adjudication, but when we meet at our annual feast let harmony prevail ; let all work for the good of the whole. Why do I say these words ? It seems to me the time has come when the stock breeders' int rests can only be recognized and protected by combination. We know of the Standard Oil Company, of the steel trust (I won't say it is not well named), of trusts of all kinds—of maids, married women, and widows. Then let every stock breeder join our association. We don't want him to pool his stock. We don't offer gold mine shares at 10 cents each, but we do ask him to join our association, and if trouble comes between railways or other sources, let us know.

Anticipation was my second theme. I don't know that I have struck the right word. Old Jorrock says : "Anticipation is hunting the fox in your dreams and throwing your wife to the hounds." My anticipations probably in my dreams are : That there will be no foolish political, criss cross customs between ourselves and people over the borders. That the farmers and stock breeders, the veterinary surgeons and Boards of Health may lie down together, and a little child may take its natural sustenance from the cow, without being frightened thereby. That disease and death lurking germs may not be anticipated until diagnosed.

My regret is to announce to you the death of my late predecessor, of which you are all aware. I venture to say there is not a man within reach of my voice but that he feels, as I do, the loss of a friend. A good man has left our ranks. I refer to the late John I. Hobson. He was a man I loved. Strong in his convictions ; his very opposition only brought out those qualities which every man opposed appreciated the more. He was manly, firm, and true to his opinions. And may I add that his absence I have never felt more than at the present time. Will you allow me to suggest that a committee be appointed to draft a suitable recognition to be presented to his widow and daughter. If there are others of our membership who have left us for another sphere, a new world, if their friends will hand in their names I shall be pleased to receive a motion that our sympathies shall be extended to their families, and to appoint a committee to carry out the wishes of the meeting.

OFFICERS FOR 1901.

President.....RICHARD GIBSON, Delaware.
Vice-President.....ARTHUR JOHNSTON, Greenwood.
Secretary-Treasurer.....A. P. WESTERVELT, Toronto
Vice Presidents (representing the different Provinces)
Ontario.....H WADE, Toronto.
Manitoba.....Hon. T GREENWAY, Crystal City, Man.
Northwest Territories.....CHAS W. PETERSON, Calgary, Alta.
Quebec.....H D. Smith, Compton, Que.
Nova Scotia.....E. B. ELDERKIN, Amherst, N. S.
New Brunswick.....BLISS FAWCETT, Sackville, N.B.
British Columbia.....G. H. HADWIN, Duncan's, B.C
Prince Edward Island.....Senator D. FERGUSON, Charlottetown.
Newfoundland.....Hon. THOS C. DUDER, St. John's.
Directors :
Shorthorns.....ARTHUR JOHNSTON, Greenwood, and
T. E. ROBSON, Ilderton.
Herefords.....H. WADE, Toronto, and
W. H. HUNTER, The Maples.
Galloways.....D. MCCRAE, Guelph.

Ayrshires	W. W. Ballantyne, Stratford, and Dan. Drummond, Myrtle.
Polled Angus	Jas. Bowman, Guelph.
Jerseys	H. G. Clark, Brampton, and Capt. Rolph, Markham.
Ontario Agricultural College	Prof. G E Day, Guelph.
General Director	A W. Smith, Maple Lodge.
Auditor	J. M. Duff, Guelph.
Delegates to Fair Boards:	
Toronto Industrial	Major McGillivary, Uxbridge, and A. P. Westervelt, Toronto.
Ottawa	J. G. Clark, Ottawa, and F. W. Hodson, Ottawa.
London	R. Gibson, Delaware, and Capt. T. E. Robson, Ilderton.
Brantford	G. W. Clemons, St George, and J. R. Alexander, Brantford.
Provincial Winter Fair	G. W. Clemons, S. George, Arthur Johnston. Greenwood, and John Bright, Myrtle.

JUDGES FOR PROVINCIAL WINTER FAIR.

Moved by Major McGillivray, seconded by John Bright, "That we nominate the judges, and leave the appointment in the hands of the Executive Committee of the Winter Fair." Carried.

On motion of Robert Miller, seconded by Henry Wade, it was resolved, "That two breeders and one exporter compose the Committee that will pass upon cattle exhibits at the Provincial Winter Exhibition."

Judges nominated: Robert Miller, Stouffville; W. B Watt, Salem; John Gibson, Denfield; Thomas Crawford, Toronto; Joseph Gould, Toronto; W. D. Flatt, Hamilton; A. W. Smith, Maple Lodge; A. J. Dann, Toronto.

Major McGillivray moved, seconded by W. G. Pettit, "That a proper memorial be prepared and signed by the President and Secretary on behalf of this Association, for transmission to the family of the late John I. Hobson." Carried.

The meeting adjourned to meet at the call of the Secretary.

EXECUTIVE MEETING.

The executive meeting of the Dominion Cattle Breeders' Association was held in the Palmer House, Toronto, on Wednesday, June 27th, 1900, at 3 30 p m., the President, Mr. Richard Gibson, in the chair.

At the adjourned annual and directors' meeting of the Dominion Cattle Breeders' Association held in March, a resolution was passed instructing the Executive to amend the by-laws

The Executive made the following addition to the by-laws according to the above instruction.

Clause 2, to read thus: The officers shall consist of a president, a vice-president, a secretary treasurer, and one director, to represent each of the established breeds, "or two directors to represent an affiliated cattle breeders' association."

After clause 5, the following be incorporated:

(*a*) Or the members of any cattle breeders' association may be accepted as members of this Association at the rate of 50 cents per member, to be paid out of the funds of the first named association.

(*b*) Any association joining as above will be entitled to, and may nominate annually two representatives to the board of directors of the Dominion Cattle Breeders' Association

(c) These two directors shall have full and complete control of the membership fees paid by the Association they represent, into the funds of the Dominion Cattle Breeders' Association.

After clause 3:

By virtue of his office, the Live Stock Commissioner of the Dominion of Canada, shall be a member of the directorate and the executive of this Association, and shall enjoy all the powers and privileges of an annually elected director or executive officer.

The meeting then adjourned.

SPECIAL MEETING OF CATTLE BREEDERS.

A special meeting of cattle breeders was held in the City Hall, Guelph, on Thursday, December 13th, at three p.m., to discuss the Tuberculine Test. Hon. John Dryden, Hon. Sidney Fisher and a large number of breeders were present, and the matter was thoroughly discussed.

MEMBERS OF THE DOMINION CATTLE BREEDERS' ASSOCIATION, 1900–1901.

NAME AND ADDRESS.	BREED.
Acres, J. G., Vernon	Holsteins.
Argo, Wm., Eden Mills	Grades.
Armstrong, Wm., Locust Hill	Holsteins.
Adams, E., 5 Widmer st., Toronto	Holsteins.
Armstrong, M., Tilsonburg	Holsteins.
Arnold, J. R., Easton's Corners	Holsteins.
Anderson, Thomas, Lyn	Holsteins.
Airth, H. J., Renfrew	Holsteins.
Ballantyne, W. W., Stratford	Ayrshires.
Baines, G. W., Guelph	
Bright, John, Myrtle	Shorthorns.
Bow Park Farm Co., Brantford	
Bowman, James, Guelph	Polled Angus.
Bonnycastle, F., Campbellford	Shorthorns.
Brown, J., Galt	Herefords.
Brown Ranch Co., Cardston, Alta.	Shorthorns.
Boyd, Mossom, Bobcaygeon	
Burt, J. W., Coningsby	Polled Angus.
Bull, D. O., Brampton	Jerseys.
Bull, L. C., Brampton	Jerseys.
Bull, B. H., Brampton	Jerseys.
Bull, W. P., Toronto	Jerseys.
Bollert, H., Cassel	Holsteins.
Brown, W. W., Lyn	Holsteins.
Baird, Charles, Motherwell	Holsteins.
Bell, James R., Athelstan, Que	Holsteins.
Brown, D. H., Kelso, Que	Holsteins.
Beck, S. R., South Cayuga	Holsteins.
Brown, F. L., Kelso, Que	Holsteins.
Bonsall, H., Chemainus, B.C.	Holsteins.
Beemer, John, St. George	Holsteins.
Bald, Adam M., Sebringville	Holsteins.
Chapman & Son, J. G., St. Thomas	Shorthorns.
Cooke, Ephraim, Norwich	
Clarridge, H. C., Brampton	Jerseys.
Clark, H. G., Brampton	Jerseys.
Clark, J. L., Norval	Jerseys
Clarkson, John, Summerville	Holsteins.
Clemons, G. W., St. George	Holsteins.
Carlaw, Thomas B., Warkworth	Holsteins.
Charlton, Thomas W., St. George	Holsteins.
Cameron, Andrew, Westwood	Holsteins.
Cameron, J. W., Perth	Holsteins.
Curtis, C. H., Newmarket	Holsteins.
Conner, John, Gananoque Jct.	Holsteins.
Craik, Dr. Robert, Montreal, Que.	Holsteins.
Came, F. E., Montreal, Que.	Holsteins.
Cohoe, J. W., New Durham	Holsteins.
Caskey, J. A., Madoc	Holsteins.

NAME AND ADDRESS.	BREED.
Davis, J. F., Tempo	Shorthorns.
Dawson, Robert, Guelph	Shorthorns.
Dent, T. H., Woodstock	Jerseys.
Dingle, J. H., Hamilton	Steers.
Dixon, W. L., Dromore	
Douglas, James, Caledonia	Shorthorns.
Dyment, N., Clappison	Ayrshires.
Davies, Robert, Toronto	Jerseys.
Davies, George, Todmorden	Jerseys.
Duncan, W. A., Emery	Holsteins.
Davidson, Thomas, Spring Valley	Holsteins.
Dundon, John, Hedley Lodge	Holsteins.
Dore, W. O., Trout Creek	Holsteins.
Dougherty, Jas. W., New Durham	Holsteins.
Duncan, David, Don	Jerseys.
Duncan, E., Don	Jerseys.
Elderkin, E. B., Amherst, N S	
Ellis, Wm. G., Bedford Park	Holsteins.
Fairbairn, H. K., Thedford	Jerseys.
Fried & Sons, J., Roseville	Shorthorns.
Ford, Robert, Kemble	
Fleming, R. J., Toronto	Jerseys.
Fleming, E. N., Toronto	Jerseys.
Fletcher, Jos., Oxford Mills	Holsteins.
Flack, Samuel, Red Deer, Alta.	Holsteins.
Foster, A. D., Halloway	Holsteins.
Foxton, Richard, New Dublin	Holsteins.
Ferland, Joseph B., Three Rivers	Holsteins.
Gardhouse, J. M., Highfield	Shorthorns.
Grainger & Son, Wm., Londesboro'	Shorthorns.
Golding & Son, H., Thamesford	Shorthorns.
Green, James, Fergus	Shorthorns.
Guy, Frank, Bowmanville	Ayrshires.
Green, F., Greenwood	Jerseys.
Gifford, A., Meaford	Holsteins.
Glass, Geo. O., Sweetsburg, Que.	Holsteins.
Glennie, James, Longburn, Man.	Holsteins.
Gilroy, G. A., Glen Buell	Holsteins.
Gilroy, C. J., Glen Buell	Holsteins.
George, H. E., Crampton	Holsteins.
Gies, C. R., Heidelburg	Holsteins.
Hall, Walter, Washington	Polled Angus.
Hales, A., Guelph	
Hill, G. W., Cumnock	Shorthorns.
Hodson, F. W., Ottawa	
Hood, G. B., Guelph	Grades.
Howden, J. D., Whitby	Shorthorns.
Hume, Alex., Menie	Ayrshires.
Hinman, E. B., Grafton	Jerseys.

MEMBERS OF THE DOMINION CATTLE BREEDERS ASSOCIATION.—*Continued.*

NAME AND ADDRESS.	BREED.
Hallman, A. C., New Dundee	Holsteins.
Hoover, Jr., A., Oshawa	Holsteins.
Hawse, Wm., Athens	Holsteins.
Honey, Richard, Brickley	Holsteins.
Hubbs, Louis P., Hillier	Holsteins.
Hartley, Thomas, Norwich	Holsteins.
Hartley, Henry, New Durham	Holsteins.
Indian School, Red Deer, Alta	Holsteins.
Jackson, A. F. Downsview	Jerseys.
Jones, M. J., Villa Nova	Holsteins.
Kaufman, A. E., Washington	Polled Angus.
Kendall, A. J., Walkerville	Shorthorns.
Kitching, George, Corwbin	Shorthorns.
Ketchen, J. B., Coleman	Jerseys.
Kincaid, C. A., Lyn	Holsteins.
Kennedy, A., Ayr	Holsteins.
Lindsay, Jr., James, Fergus	Shorthorns.
Lloyd-Jones & Son, T., Burford	Guernseys.
Love, Alex., Eagle	Shorthorns.
Lee, Erland, Stoney Creek	Jerseys.
Logan, H. L., Amherst Point, N.S.	Holsteins.
Logan, S. A., Amherst Point, N.S.	Holsteins.
Lee, J. W., Simcoe	Holsteins.
Lint, John W., Attercliffe Station	Holsteins.
Milne, David, Ethel	
Massey, W. E. H., Toronto	Jerseys.
Mitchell, Jas. E., Guelph	Steers.
Myles, J. & G., Heathcote	Shorthorns.
Mooney, J. W., Inverness, Que	Shorthorns.
Mallory, B., Frankford	Holsteins.
Moorhead, Jas. G., Ventnor	Holsteins.
Macklin, Sidney, Wicklow	Holsteins.
McCrae, David, Guelph	Galloways.
McKee, H. & J., Norwich	Ayrshires.
McDougall, A., Guelph	
McFarland, John, Clinton	Polled Angus.
McDonald, D. R., Williamstown	Holsteins.
McGregor, John, Constance	Holsteins.
McClure, Wm., Norval	Holsteins.
McNeil, C. A., Ganan que	Holsteins.
McCuaig, M., Vanleek Hill	Holsteins.
McDonald, Peter A., Ormond	Holsteins.
Newlands, Wm., Eburne, B.C.	Holsteins.
North, George, Marden	Holsteins.
Oke & Sons, Jas., Alvinston	Shorthorns.
O'Brien, John, London West	Jerseys.
Ontario Agr. College Guelph	Holsteins.
Oughton, Jno., Middlechurch, Man.	Holsteins.
O'Mahoney, Daniel, Renton	Holsteins.
Pritchard, Thomas, Elora	Grades.
Pannabecker, E., Hespeler	Holsteins.
Pirie, Francis, Putnam	Holsteins.
Park, Henry, Norwich	Holsteins.
Pickering, John, Frelighsburg, Que.	Holsteins.
Potter, A. B., Montgomery, Assn.	Holsteins.
Page, H. F., Mission, B.C.	Holsteins.
Patten, J. H., Paris	Holsteins.
Palmer, B. J., New Durham	Holsteins.
Patterson, Wm., Wawanesa, Man.	Holsteins.
Peters, O. J., Moncton, N.B.	Holsteins.
Rawlings, Albin, Forest	Herefords.
Rettie Bros, Norwich	Holsteins.
Reid & Co., R., Hintonburg	Ayrshires.
Rice, A. & G., Currie's Crossing	Holsteins.
Richardson, A., Peepabun	Shorthorns.
Robinson, R. J., Ailsa Craig	
Rudd, W. J., Eden Mills	Devons.
Rudell, Abram, Hespeler	Shorthorns.
Rolph, Wm., Markham	Jerseys.
Reid, R., Berlin	Jerseys.
Reesor, Robert, Markham	Jerseys.
Reesor, F. E. N., Locust Hill	Holsteins.
Rosebrugh, James, St. George	Holsteins.
Rice, Alfred, Curries	Holsteins.
Rife, David, Hespeler	Holsteins.
Rettie, James, Norwich	Holsteins.
Richardson, Matt, Caledonia	Holsteins.
Rice, George, Curries	Holsteins.
Richardson, John A., South March	Holsteins.
Robertson, J. W., Vanleek Hill	Holsteins.
Reece, Jonathan, Chilliwack, B.C.	Holsteins.
Sharp, James, Rockside	Polled Angus.
Stewart & Son, Wm., Menie	Ayrshires.
Stewart & Son, Wm., Lucasville	Polled Angus.
Stephen, W. F., Trout River, Que.	Ayrshires.
Stewart, Peter, Everton	
Smith, J. H., Highfield	Jerseys.
Scatcherd, Edwin, Wyton	Holsteins.
Stewart, John W., Lyn	Holsteins.
Sohring, Wm., Sebringville	Holsteins.
Shunk, Simon, Edgeley	Holsteins.
Stevenson, R. S., Ancaster	Holsteins.
Sangster, N., Ormstown, Que.	Holsteins.
Sweet, Ogden, North Sutton, Que	Holsteins.
Schell, Walter S., Woodstock	Holsteins.
Sheridan, J. B., Slate River Valley	Holsteins.
Steves, J. M., Steveson, B.C.	Holsteins.
Simmons, W. H., New Durham	Holsteins.
Smith, C. H., Plum Hollow	Holsteins.
Shunk, Wm., Sherwood, Ont.	Holsteins.
Smith, S. E., Dundas	Holsteins.
Sturgis, D. E., Tilsonburg	Holsteins.
Smith, Frank W., Scotland	Holsteins.
Smith, A. C., Paris	Holsteins.
Smith, Amos, Trowbridge	Shorthorns.
Sibbald, F. C., Sutton West	Shorthorns.
Smith, A. W., Maple Lodge	Shorthorns.
Scott, F. W., Highgate	Shorthorns.
Taylor, F. W., Wellman's Corners	Ayrshires.
Tape Bros., Ridgetown	Shorthorns.
Talbot, Dan., Everton	Shorthorns.
Templer, Wm., Jerseyville	Shorthorns.
Tufts, Robert, Tweed	Jerseys.
Telfer, Thomas, Ingersoll	Holsteins.
Tillson, E. D., Tilsonburg	Holsteins.
Usher, Isaac & Son, Queenston	Shorthorns.
Webb, Irwin, Elora	Steers.
Woolsey, R. G., Fort William	
Willis, Wm., Newmarket	Jerseys
Woolley, Alex, Springfield	Holsteins.
Welsh, Henry, Weston	Holsteins.
Walker, R. W., Utica	Holsteins.
Wylie, James H., Almonte	Holsteins.
Willis, Jr., R., Glen Meyer	Holsteins.
Wyckoff, I. G., Tyrrell	Holsteins.
Yuill & Sons, J., Carleton Place	Ayrshires.

N. B.—The members of the Shorthorn Breeders' Association and the Ayrshire Breeders' Association are also members of the Cattle Breeders' Association.

DOMINION SHEEP BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Sheep Breeders' Association was held in the Palmer House, Toronto, at 10 a.m. on February 22nd, 1901, the President, Mr. A. W. Smith, in the chair.

The minutes of the last meeting were taken as read.

The Secretary-Treasurer read his annual report, which was taken up clause by clause and adopted with the amendments, as given below :

It was recommended that the general admission to the Provincial Winter Show be the same as last year.

On motion of D. McCRAE, seconded by RICHARD GIBSON, it was resolved : "That the clause relating to 'Ten per cent. added to Prizes' be left as last year, that is, the report on feeding be made after the show instead of before."

Moved by Major McGILLIVRAY, seconded by Captain ROBSON, "That the Secretary be instructed to inform the Provincial Winter Fair Board of the action of this meeting on the appointment of judges and the sheep prizes. The action in one case being a single judge, and the other, confining prizes to carcases of wethers, as amended." Carried.

OFFICERS FOR 1901.

President.....A. W. SMITH, Maple Lodge.
Vice-President.....R. H. HARDING, Thorndale.
Secretary-Treasurer.....A. P. WESTERVELT, Toronto.

Directors :

Cotswolds.....D. McCRAE, Guelph.
Leicesters.....JAS M. GARDHOUSE, Highfield.
Hampshires and Suffolks.....JOHN KELLY, Shakespeare.
Dorsets.....JOHN A. McGILLIVRAY, Uxbridge.
Southdowns.....JOHN JACKSON, Abingdon.
Oxfords.....JAS. TOLTON, Walkerton.
Lincolns.....JOHN GIBSON, Denfield.
Merinos.....W. M. SMITH, Fairfield Plains.
Shropshires.....D G. HANMER, Mt. Vernon.
Ontario Agricultural College...G E. DAY, Guelph.
Auditor.....J. M. DUFF, Guelph.

Delegates to Fair Boards :

Toronto Industrial.....J. M. GARDHOUSE, Highfield, and JOHN JACKSON, Abingdon.
Ottawa.....F. W. HODSON, Ottawa.
London.....A. W. SMITH, Maple Lodge, and A. P. WESTERVELT, Toronto.
Provincial Winter Fair.....A W. SMITH, Maple Lodge, JOHN JACKSON, Abingdon, and JAS. TOLTON, Walkerton

FINANCIAL STATEMENT.

Receipts.		Expenditure.	
Members' fees	$ 68 00	Balance due Treasurer, as per last report.	$283 43
Legislative grant	2,000 00	Prizes, Winter Fair	1,349 11
		Officers' salaries	200 00
		Directors' fees and expenses	106 15
		Postage and stationery	71 67
		Printing	49 22
		Periodicals for members	69 07
		Cost of reporting	10 25
		Miscellaneous—	
		Typewriting and office work	204 58
		Telegraph, telephone, express, duty, etc.	24 05
		Auditor	5 00
		Cleaning office	2 00
		Balance stock car account	22 98
		Expense, 1899, in connection with investigating alleged fraud re shipment of stock to the West	8 33
	$2,068 00		$2,405 84
		Balance due Treasurer	337 84

Examined and found correct,
this 20th day of March, 1900.
J. M. Duff, Auditor.

A. W. Smith, President.
A. P. Westervelt, Treasurer.

PRESIDENT'S ADDRESS.

By A. W. Smith, Maple Lodge.

I have great pleasure in congratulating the sheep breeders of Canada upon the flourishing condition of our trade or business. The past year has been one of the most prosperous, I believe, in my recollection, for the sheep breeders of the Dominion. And this, I believe, applies to all the mutton breeds, and principally because they are of the mutton breeds.

Some years ago almost the only mutton or lamb placed on the market of the United States from the West was that from Merinos, but with the decline in the price of wool, the sheep raisers turned their attention to improving the mutton qualities of their sheep, with the result that all our surplus breeding stock have found a ready market in the West, and as the quality of western mutton and lamb improved, so also did the demand for it, and for sometimes not sufficient is offered at the large market centres to supply requirements. In Chicago alone, fifteen to twenty thousand a day are picked up more readily by far than as many hundred would be a few years ago. This in turn creates more demand for our Canadian sheep, for the observant ranchmen have discovered in Canada a country where they can procure sheep—not only of the very best type and quality, but with rugged and hardy constitutions, free from all diseases that so often decimate flocks in almost all other countries. So with practically an unlimited market for our sheep, and a climate so thoroughly healthy, food so easily and luxuriantly grown, and our breeders so eminently fitted to raise the highest types of the different breeds, because of their intelligence, foresight, and hereditary hustling habits, our sheep business is in the prosperous condition it is to-day.

I consider it very fortunate for the breeders and sheep raisers generally of Canada that our principal aim is to produce mutton and lamb of the finest quality, because it is so much more stable than when wool is the chief object for which we breed. The price of wool is so much controlled, by the whims of fashion, that it is impossible to follow it with profit. But when we are catering to the appetite of the lovers of choice lamb we are on sure footing and know what we have to do, and do continually, for it is only the prime saddles, chops, and legs that are always in demand. And while that low price of

wool may reduce the returns from our flocks somewhat in one direction, it is after all profitable for us, because it holds our largest customers steadily in our straight road, which requires what we can supply, and prevents their running after some of the breeds useful for wool only, and which we produce only in small numbers.

I think we can congratulate ourselves, also, upon the wonderful success our exhibitors have had in competition with all parts of the continent, at the large exhibitions where our stock has been placed in competition.

JUDGES FOR THE PROVINCIAL WINTER FAIR.

Moved by RICHARD GIBSON, seconded by J. M. GARDHOUSE, "That the appointment of judges for the Provincial Winter Fair be left in the hands of the Winter Fair Board" Carried."

EXPERT JUDGES.

The following expert judges were then chosen :

Cotswolds.—John Rawlings, Ravenswood ; Wm. Thompson, Uxbridge ; Val. Ficht, Oriel ; R. Honey, Brickley ; Jas. Hume, Arkell ; W. G. Laidlaw, Wilton Grove ; Jos. Ward, Marsh Hill ; J. D. Davidson, Belhaven ; John Slater, Buttonville ; Jas Russell, Richmond Hill ; Thos. Teasdale, Concord ; J. C. Snell, London ; F. Bonnycastle, Campbellford ; John Park, Burgessville ; J. Hardy Shore, Glanworth ; Wm. Rae, Arkell ; A. Johnston, Greenwood ; A. J. Watson, Castlederg ; Professor Day, Guelph. *Judges nominated*—Toronto : R. Miller, Stouffville ; T. Hardy Shore, Glanworth ; Jas. Hume Arkell. London : W. Thompson, Uxbridge ; Wm. Rae, Arkell. Ottawa : W. G. Laidlaw, Wilton Grove ; F. Bonnycastle, Campbellford. Chicago : Prof. Curtiss, Ames, Ia.

Leicesters.—Jas. Fennell, Bradford ; H. B. Jeffs, Bond Head ; A. E. Archer, Warwick ; Geo. Whitelaw, Guelph ; John Wells, Galt ; Hardy Shore, Glanworth ; Abraham Easton, Appleby ; E. Wood, Appleby ; Wm. Parkinson, Eramosa ; E. Parkinson, Eramosa ; John Orr, Galt ; Wm. Watt, Salem ; Wm. McIntosh, Burgoyne ; Thos. Currelly, Fullarton ; R. Eastwood ; Mimico ; John Kelly, Shakespeare ; And. Thompson, Fergus ; J K Campbell, Palmerston ; J. C. Snell, London ; G B Armstrong, Teeswater ; John Gibson, Denfield ; C. E. Wood, Freeman ; Jos. Gaunt, St. Helens ; J. M. Gardhouse, Highfield ; And. Whitelaw, Guelph ; William Whitelaw, Guelph ; R. C. Martin, Marysville ; Alex. Smith, Maple Lodge ; Alex. Waldie, Acton ; Walter Nichol, Plattsville ; H G. Arnold, Maidstone ; Prof. Craig, Ames, Ia. ; John Marshall, Cass City, Mich. ; J. W. Murphy, Cass City, Mich. ; Prof. Curtiss, Ames, Ia. ; D. C. Graham, Cameron, Ill ; Geo. Penhale, Exeter ; Jas. Snell, Clinton ; John Wright, Chesley ; Prof. Day, Guelph ; M. Kennedy, Northwood ; D. Lillico, Ayr. *Judges nominated.*—Toronto : William Parkinson, Eramosa ; Jas. Fennell, Reserve. London : John Wright, Chesley ; J. B. Jeffs, Reserve, Ottawa : John Orr, Galt. Brantford : W. Whitelaw, Guelph.

Dorsets.—Jas. Kelly, Shakespeare ; Chas. Fairbairn, Bobcaygeon ; Robert Miller, Pickering ; J. C. Snell, London ; J. M. Gardhouse, Highfield ; Jas. Johnston, Trafalgar ; John Campbell, Vernon ; John Jackson, Abingdon ; J G. Hanmer, Mt. Vernon ; Richard Gibson, Delaware ; W. H. Beattie, Wilton Grove ; Prof. Curtiss, Ames, Ia.. Thos. W. Hector, Springfield-on-the Credit ; G P. Everett, Mount Vernon ; Mortimer Levering, Lafayette, Ind. ; A. Danks, Allamuchy, N. J. ; Prof. Craig, Ames, Ia. ; Jas. Tolton, Walkerton ; H. N. Gibson, Delaware ; G. McKerrow, Sussex, Wis. ; Henry Arkell, Teeswater ; Henry Arkell, Arkell ; E. O. Denton, Somerset, N. Y. ; Herbert Hanmer, Burford ; R. Bailey, Union.

Southdowns—John Miller, Markham ; H. N. Gibson, Delaware ; John Jackson, Abingdon ; T. C. Douglas, Galt ; Henry Arkell, Teeswater ; W. H. Beattie, Wilton Grove ; A. Simenton, Blackheath ; Wm. Telfer, Paris ; J. G. Hanmer, Mt. Vernon ; Jas. Smith, Mt. Vernon ; H. B. Jeffs, Bond Head ; Jas. Scott, Aberfoyle ; Geo. McKerrow, Sussex,

Wis.; Prof. Curtiss, Ames, Ia; Prof. J. A. Craig, Ames, Ia; J. C. Duncan, Lewiston, N. Y.

Oxfords.—Smith Evans, Gourock; Jas. Tolton, Walkerton, R. J. Hine, Dutton; Kenneth Finlayson, Campbellton; Henry Arkell, Arkell; William Dickson, Mildmay; Peter Arkell, Teeswater; John Harcourt, St. Ann's; J. H. Jull, Mount Vernon; W. H. Arkell, Teeswater; John E. Cousins, Harriston; Arch. McKenzier, Corwhin; R. E Birdsall, Birdsall; Geo McKerrow, Sussex, Wis.; W. A. Shafer, Middleton, Ohio; J. V. Cooper, Picton; Wm Newman, Cherry Valley; Wm. Arkell, Teeswater; Jas. L. Tolton, Walkerton; L. Parkinson, Greenock; A. Elliott, Pond Mills; D. Brown, Iona; H. N. Gibson, Delaware; W Lee, Simcoe; Prof. Craig and Prof. Curtiss, Ames, Ia. *Judges nominated.*—Toronto: Jas. Tolton, Walkerton; Henry Arkell, Arkell. London: W. H. Arkell, Teeswater; J. L. Tolton, Walkerton.

Hampshires and Suffolks.—R. Gibson, Delaware, Ont.; H. Arkell, Arkell; Prof. J. A. Craig, Ames, Ia; Ira Hiller, Thoonton, Mich.; W. H. Beattie, Wilton Grove; Jas.; Bowman, Guelph; Prof. Kennedy, Columbus, Ohio, U. S; W. R. Bowman, Mount Forest; John Kelly, Shakespeare.

Lincolns.—L. Parkinson, Eramosa; J. T. Gibson, Denfield; W. Oliver, Avon Bank; T. E Robson, Ilderton; G. Walker, Ilderton; John Geary, J. C. Snell, London; R. W. Stevens, Lambeth; John Mitchell, Glencoe; John White, Eramosa; A. W. Smith, Maple Lodge; Geo. Whitelaw, Guelph; Hardy Shore, White Oak; J. H. Patrick, Ilderton; Jas. Petty, Hensall; J. M. Gardhouse, Highfield; Prof. Craig, Ames, Ia.

Shropshires.—R Gibson, Delaware; G. P. Everett, Mt. Vernon; J. Conworth, Paris; W. H. Beattie, Wilton Grove; A. Brown, Picton; R. Miller, Stouffville; J. Hanmer, Burford; J. Campbell, Woodville; D. G. Hanmer, Burford; M. Levering, Lafayette, Ind.; A. Elliott, Galt; J. Dickin, Milton West; J. S Thompson, Cas's City, Ind.; Geo. Allen, Allerton, Ill.; W. G. Pettitt, Freeman; D. J. Campbell, Woodville; G. Phinn, Hespeler; Chas. Calder, Brooklin; H. N. Gibson, Delaware; Geo. Hindmarsh, Ailsa Craig; C. W. Gurney, Paris; W. E. Wright, Glanworth; J. Miller, Brougham; H. Hanmer, Burford; Prof. Curtiss, Ames, Ia; J. C. Duncan, Lewiston, N. Y.; G. McKerrow, Sussex, Wis.; Prof. Day, Guelph; S. Hagar, Plantagenet; Jos. Barnett, Rockland; Geo. L. Telfer, Paris.

Judges nominated.—Toronto Industrial: J. C. Duncan, Lewiston, N. Y; reserve, Geo. Phin, Hespeler, Ont. Western Fair, London: Andrew Elliott, Galt, Ont.; reserve, George Hindmarsh, Ailsa Craig, Ont. Central Fair, Ottawa: R. Gibson, Delaware, Ont.; reserve, J. W. Barnett, Rockland, Ont Provincial Winter Fair: J. C. Duncan, Lewiston, N. Y.; reserve, Robert Miller, Stouffville, Ont.

Merinos.—Rock Bailey, Union; Andrew Terrell, Wooler; G. P. Everett, Mount Vernon; W. H. Beattie, Wilton Grove; W. M. Smith, Scotland; R. Shaw, Glanford Station; J. G. Hanmer, Mount Vernon; Geo. McKerrow, Sussex, Wis.

NEW BUSINESS.

Moved by JOHN CAMPBELL, seconded by J. A. McGillivray, "That this Association request Fair Boards to strike out the section in prize lists in which prizes are offered for ewes two shears and over, substituting therefor, a prize for pen of three shearling ewes bred by exhibitor, and that ewes shall be shown singly instead of in pairs. Also that the prizes offered for aged rams shall be confined to those under three years old."

This resolution was taken up by clause and passed on as follows:

On motion of JOHN JACKSON, seconded by R. GIBSON, it was resolved: "That it is the opinion of this meeting that aged ewes be struck out, and substituted with either shearling ewes or lambs.

Also that ewes should be shown singly instead of in pairs.

PAN-AMERICAN EXPOSITION.

Mr. F. W. Hodson, Dominion Commissioner of Live Stock, stated that the Dominion Government would pay for the transportation and maintenance of live stock going to the Pan-American Exposition; and they would also give free transportation to two men for each carload of stock.

R. H. Harding moved, seconded by John Kelly, "That this arrangement would be satisfactory to the Sheep Breeders' Association." Carried.

A report was received from the Committee appointed at the last meeting, in regard to dogs killing sheep. It was referred to a Committee composed of the following gentlemen: John A. McGillivray, Uxbridge; D. G. Hanmer, Burford; John Jackson, Abingdon; J. C. Snell, London; Richard Gibson, Delaware.

On motion of D. G. Hanmer, seconded by John Jackson, it was resolved, "That the thanks of this Association be tendered to our able and energetic Secretary for the excellent manner in which he has conducted the affairs of the Association during the past year. The entire oversight of the building and equipment of the new Provincial Fair Building at Guelph has been undertaken and carried out successfully by him; and we wish in this manner to indicate to Mr. Westervelt our appreciation of his untiring efforts in our behalf.

We also desire to bear testimony to the splendid service rendered to the Association by Mr. F. W. Hodson, who in his capacity of Commissioner of Live Stock for the Dominion, has on all occasions lent his experience, his time, and his untiring energies to the work of our Association." Carried.

Moved by J. A. McGillivray, seconded by D. G. Hanmer, "That a copy of the above resolution be sent to Hon. John Dryden, Minister of Agriculture for the Province, and one to Hon. Sidney Fisher, Dominion Minister of Agriculture." Carried.

J. A. McGillivray moved, seconded by Jas M. Gardhouse, "That the sum of $50 be granted by this Association to assist in paying the wages of a man taking charge of the live stock cars going to the West." Carried.

Mr. Hodson asked for an approximate number of sheep likely to be sent from Ontario to the Pan-American Exposition. The representatives of the different breeds informed him of about the number of the respective breeds that would probably be sent, and on motion of Richard Gibson, seconded by D. G. Hanmer, it was resolved: "That the matter be left in the hands of the Live Stock Commissioner."

Moved by Richard Gibson, seconded by D. G. Hanmer, "That in the opinion of this meeting it is advisable to have the annual meeting held in Toronto some time in February, if possible, in conjunction with the other live stock meetings." Carried.

The meeting adjourned to meet at the call of the Secretary.

EXECUTIVE MEETING.

The Executive meeting of the Dominion Sheep Breeders' Association took place at the Palmer House, Toronto, on Wednesday, June 27th, 1900, the President, Mr. A. W. Smith, in the chair.

At the adjourned annual and directors' meeting of the Dominion Sheep Breeders' Association, held in March, a resolution was passed authorizing the Executive Committee to make the changes in the constitution and by-laws which were under consideration by the secretary.

The following addition to the by-laws was made according to the above instruction:

"By virtue of his office, the Live Stock Commissioner of the Dominion of Canada shall be a member of the directorate and the Executive of this Association, and shall enjoy all the powers and privileges of an annually elected director or Executive officer."

The meeting then adjourned.

MEMBERS OF THE DOMINION SHEEP BREEDERS' ASSOCIATION, 1900-1901.

NAME AND ADDRESS.	BREED.
Arkell, Henry, Teeswater	Oxfords.
Armstrong, G. B, Teeswater	Leicesters.
Arkell, Henry, Arkell	Oxfords.
Allen, Robt G., Cooper	
Bow Park Co., Brantford	
Bowman, W. R., Mount Forest	
Blais, A & J., St. Anne de Prescott	Leicesters.
Bailey, Sam, Wroxeter	Cotswolds.
Benning, David, Williamstown	Leicesters.
Bowman, James, Guelph	Dorsets.
Bonnycastle & Sons, F., Campbellford	Cotswolds.
Brown, John L., Uxbridge	Cotswolds.
Brown, Wm., Fordwich	
Barker & Son, S., Mount Vernon	
Brethour, J. E, Burford	
Burns, J. H., St. Marys	
Campbell, John, Woodville	Shropshires.
Cranston, James, Denfield	
Conworth, J., Paris	Shropshires.
Cousins & Sons, J., Harriston	Oxfords.
Cornish, John W., Orchard	Dorset Horns.
Cooper, J. V. Picton	Oxfords.
Currelley & Son, T., Fullerton	Leicesters.
Douglas, T. C., Galt	Southdowns.
Donaldson, W., South Zorra	Shropshires.
Douglas, James, Caledonia	Leicesters.
Drummond, Hon. Geo. A., Beaconsfield, Que	Southdowns.
DeWitt, C. H., Niagara Falls, S.	Cotswolds.
Evans, Smith, Gourock	Oxfords.
Elliott, Andrew, Pond Mills	Oxfords.
Empey, M. N., Napanee	
Finlayson, Kenneth, Campbellton	Oxfords.
Gardhouse & Son, J. M., Highfield	Leicesters.
Gibson, Richard, Deleware	Shropshires.
Gibson, J. T., Denfield	Lincolns.
Gibson, W. H., Beaconsfield	Southdowns.
Gould & Son, Geo., Rutherford	Leicesters.
Gurney, C. W., Paris	
Harding, R. H., Thorndale	Dorset Horns.
Hanmer, J. G., Burford	Shropshires.
Hunter, John, Wyoming	Dorsets.
Hanmer & Son, D. G., Mount Vernon	Shropshires.
Hood, G. B., Guelph	
Hodson, F. W., Ottawa	
Hume, James, Arkell	Cotswolds.
Innes, Donald, Tobique River, N.B.	Cotswolds.
Johnston Bros., Underwood	Leicesters.
Jackson, John, Abingdon	Southdowns.
Jeffs & Son, E., Bondhead	Southdowns & Leicesters.
Johnston, James, Trafalgar	Dorset Horns.
Jull, J. H, Mount Vernon	Oxfords.
Kelly, John, Shakespeare	Hampshire & Leicesters.
Laidlaw, John, Wilton Grove	Leicesters.
Laird, G. H. & R., Guelph	Cotswolds.
Lemon, S., Kettleby	Southdowns.
Linton, Wm., Aurora	Cotswolds.
Lloyd-Jones & Sons, T., Burford	Shropshires.
Martin, Wm., Binbrook	Southdowns.
Martin & Son, E. E., Canning	Southdowns.
Moody, Ed., Humber	
McFarlane, John, Clinton	
McEwen, Robt, Byron	Southdowns.
McNelly, Hugh, Arkell	
McRobie, Fred, Iroquois	Leicesters.
McDonald, John W., Mill Brook, N. S.	Oxfords.
McCrae, D., Guelph	Southdowns & Cotswolds.
McLees, J. H., Beaconsfield, Que.	Dorsets.
McGillivray, J. A., Uxbridge	Dorsets.
Neil, F. H., Lucan	
Orr & Lillico, Galt	Leicesters.
Parkinson, E., Eramosa	Lincolns.
Parkinson, L., Eramosa	Leicesters.
Parks & Son, John, Burgessville	Cotswolds.
Pickering, John, Frelighsburg	
Rae, Wm., Arkell	Cotswolds.
Rawlings, John, Ravenswood	Cotswolds.
Rawlings, J, Forest	
Robson, T. E., Ilderton	Lincolns.
Rudd, W. J., Eden Mills	Suffolks.
Rudell, Abram, Hespeler	Shropshires.
Smith, John, Beachville	
Switzer, N. W., Streetsville	
Smith, A. W., Maple Lodge	Leicesters.
Smith, W. M., Fairfield Plains	Merinos.
Scott, James, Aberfoyle	Southdowns.
Stevens, R. W., Lambeth	Lincolns.
Snell, James, Clinton	Leicesters.
Shore, Hardy, Glanworth	Cotswolds.
Telfer & Sons, A., Paris	Southdowns.
Tolton, James, Walkerton	Oxfords.
Thompson, Wm., Uxbridge	Cotswolds.
Wren, Christopher, Uxbridge	Shropshires.
West, Wm., Ilderton	Lincolns.
Wright, W. E, Glanworth	Shropshires.
Wright, John, Mohawk	Leicesters.
Wright, John, Chesley	
Whitelaw Bros., Guelph	Leicesters.
Wilkie, Geo. H., Wisbeach	
Wood, C. & E., Freeman	Leicesters.
White, John, Eramosa	Lincolns.
Yuill & Sons, James, Carleton Place	Shropshires.

DOMINION SWINE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The annual meeting of the Dominion Swine Breeders' Association convened at the Palmer House, Toronto, February 21st, 1901, at 1.30 p. m. President William Jones, in the chair.

On motion of GEO. GREEN, seconded by THOS. TEASDALE, the minutes of the last meeting were taken as read.

The Secretary-Treasurer then read his Annual Report, which, after being taken up clause by clause, was adopted.

Considerable discussion took place as to the suggestion made by the Secretary in regard to allowing one hundred members of any one Farmers' Institute, free admission to the Provincial Winter Fair, on payment of $5 by said Institute and $5 for each additional hundred.

A number of the members thought this should be limited to $5 for fifty members from any one institute, while others were of opinion that the members of these institutes should be charged regular admission fees.

It was agreed, however, after explanation by one of the members, that the plan suggested by the Secretary was a good one, as it had worked out well last year and was the means of bringing out a great many institute men and promoting the show in general.

A protracted discussion arose as to the advisability of allowing the classification in the bacon class to remain as last year, and to erase from the Secretary's report the word "alive", mentioned under the heading of "Swine Prizes" in the report.

JOS. FEATHERSTON moved, seconded by GEO. GREEN, "That the Secretary's report be amended by striking out the word "alive."

This resolution was put to the meeting and carried, but after Live Stock Commissioner Hodson had gone thoroughly into the matter, and explained to the members that it would be impossible to get any grants from the different pork-packing companies should they allow it to stand, they reconsidered it and adopted the following motion:

Moved by F. W. HODSON, seconded by A. SMITH, "That on condition the packers carry out their promise and give at least from three to five hundred dollars towards the prize list of the Provincial Winter Fair that the classification stand as stated in the Secretary's report."

FINANCIAL STATEMENT.

RECEIPTS.		EXPENDITURE.	
Cash on hand from previous year, as per last report	$718 36	Prizes Winter Fair	$1,504 11
Members' fees	580 00	Officers' salaries	200 00
Legislative Grant	1,500 00	Directors' fees and expenses	81 76
Miscellaneous:		Postage and stationery	97 01
Record fees	988 39	Printing	837 23
Interest on mortgage	50 00	Periodicals for members	199 79
		Cost of reporting	8 75
		Miscellaneous:	
		Typewriting and office work	207 60
		Telegraph, telephone, express, duty, etc.	26 71
		Auditor	5 00
		Paper for annual report	25 00
		Proof reading Vol. 10 record	100 00
		Cleaning office	2 00
		Balance stock car account	22 98
		Expense, 1899, in connection with investigating alleged fraud, *re* shipment of stock to the west	8 34
	$3,836 75		$3,326 28
		Balance on hand	510 47

Examined and found correct, this 20th day of February, 1901.

J. M. DUFF, Auditor.

WM. JONES, President.
A. P. WESTERVELT, Treasurer.

OFFICERS FOR 1901.

President ..... Wm. Jones, Mt. Elgin.

Vice-President ..... G. B. Hood, Guelph.

Secretary-Treasurer ..... A. P. Westervelt, Toronto.

Directors :

Berkshires ..... Thos. Teasdale, Concord.
Yorkshires ..... J. E. Brethour, Burford.
Chester Whites ..... R. H. Harding, Thorndale.
Poland Chinas ..... W. M. Smith, Fairfield Plains.
Duroc Jerseys ..... L. B. Tape, Ridgetown.
Tamworths ..... And. Elliott, Galt.
Suffolks and Essex ..... Jos Featherston, Streetsville.
Ontario Agricultural College .... G. E. Day, Guelph.

General Director ..... Geo. Green, Fairview.

Auditor ..... J. M. Duff, Guelph.

Representatives to Fair Boards :

Toronto Industrial ..... D. C. Flatt, Millgrove, and Thos Teasdale, Concord.
Ottawa ..... A. P. Westervelt, Toronto, and Campbell Smith, Hintonburg.
London ..... Geo. Green, Fairview, and D. DeCourcy, Bornholm.
Peterboro ..... Robert Vance, Ida.
Guelph ..... G. B. Hood, Guelph, and Jas. Anderson, Guelph.
Brantford ..... J. E. Brethour, Burford.
Belleville ..... J. M. Hurley, M.P., Belleville.
Kingston ..... J. M. Hurley, M.P., Belleville.
Provincial Winter Fair ..... Prof. G. E. Day, Guelph, G. B. Hood, Guelph, and Wm. Jones, Mt. Elgin.

Judges for Winter Fair.

Thomas Teasdale, Concord, (G. B. Hood, Guelph, reserve), for Poland Chinas, Chester Whites, Duroc Jerseys and Essex.

William Jones, Mount Elgin, on Yorkshires and Tamworths.

R. H. Harding, Thorndale, for Berkshires and Grades.

H. B. Jeffs, Bond Head, (reserve.)

Expert Judges.

The following are the expert judges recommended :

Berkshires—P. W. Boynton, Dollar; Alex. Smith, Maple Lodge; Wm. Jones, Zenda; W. G. Caven, East Toronto; James McEwen, Kerteh; John Boyes, jr., Churchill; Henry Jones, Zenda; H. J. Davis, Woodstock; J. C. Snell, London; Thos. Teasdale, Concord; Geo. Green, Fairview; Robert Vance, Ida; T. A. Cox, Brantford; Jas. Quirie, Delaware; Jos. Featherston, Streetsville; R. P. Snell, Snelgrove; C. R. Decker, Chesterfield; Chas. Youngs, Brookdale; D. DeCourcy, Bornholm; R. H. Harding, Thorndale; Jos. Barnett, Rockland; E. E. Martin, Canning; H. B. Jeffs, Bond Head; Wm. Linton, Aurora; E. Brien, Ridgetown; G. B. Hood, Guelph; J. E. Brethour, Burford; Alex. Hart, Hempstead; W. A. Shields, Milton.

Yorkshires and Tamworths.—Lou Rogers, Weston; Geo. D. Batzner, Copetown; R. J. Kerr, Mimosa; W. R. Bowman, Mount Forest; Wm. Jones, Zenda; R. J. Garbutt, Belleville; E. Dool, Hartington; R. H. Harding, Thorndale; N. M. Blain, St. George; A. Dunn, Ingersoll; J. H. Simonton, Chatham; G. North, Marden; A. Elliott, Galt; L. F. Master, Haysville; A. C. Hallman, New Dundee; D. G. Hanmer, Burford; John

Nichol, Hubrey ; J. E. Brethour, Burford ; H. Caldwell, Orchard ; W. Elliott, Hamilton ; C. C. L. Wilson, Ingersoll ; F. C. Fearman, Hamilton ; A. Laurie, Wolverton ; Wm. Davies, Toronto ; Richard Gibson, Delaware ; Henry Dedels, Kossuth ; G. B. Hood, Guelph ; Jos. Featherstone, Streetsville ; H. E. Sharp, Ida ; A. F. McGill, Hillsburg ; J. G. Mair, Howick, Que.; J. M. Hurley, Belleville; Geo. Gier, Grand Valley ; James Stephen, Trout River, Que.; R. McLochlan, Harriston ; Jos. Fletcher, Oxford Mills ; Robert Nichol, Brussels ; A. F. Foreman, Collingwood ; J. Y. Ormsby, Woodstock ; Jas. Leach, Toronto ; Wm. Howe, North Bruce ; Chas. Yapp, Brantford ; G. E. Day, Guelph ; F. Shore, White Oak ; H. J. Davis, Woodstock ; D. C. Flatt, Millgrove ; W. R. McDonald, Ridgetown ; W. Elliott, Galt ; R. G. Martin, Marysville ; J. E. Cousins, Harriston ; Geo. Green, Fairview ; J. W. Caldbeck, Augustine Cove, P.E.I ; J. G. Clark, Ottawa ; J. G. Smith, Hintonburg ; D. Drummond, Myrtle.

Suffolks and Essex.—Wm. Jones, Zenda ; Geo. Green, Fairview ; Thos. Teasdale, Concord ; James McGarvin, Chatham ; R. H. Harding, Thorndale ; Jas. Main, Milton ; D. DeCourcy, Bornholm ; C. W. Yapp, Brantford ; G. B. Hood, Guelph.

Duroc Jerseys.—Geo. Green, Fairview ; Wm. Jones, Zenda ; Thos. Teasdale, Concord ; J. E. Brethour, Burford ; R. H Harding, Thorndale ; W. M. Smith, Fairfield Plains ; Jos. Featherston, Streetsville ; W. N. Tape, Bentpath ; Geo. Bennett, Charing Cross ; H. George, Crampton.

Poland Chinas.—Thos. Teasdale, Concord ; Jos. Featherston, Streetsville ; J. H. Snarey, Croton ; Jas. Main, Milton ; Geo. Green, Fairview ; W. M. Smith, Scotland ; Wm. Jones, Zenda ; Henry Jones, Zenda ; Oliver Drury, Fargo ; C. W. Yapp, Brantford ; R. Willis, Glen Meyer ; R. H. Harding, Thorndale ; Lawrence Tape, Ridgetown.

Chester Whites.—E. D George, Putnam ; R. E. Birdsall, Birdsall ; Albert Baracky, Bloomington ; Wm. Jones, Zenda ; J. C. Snell, London ; Geo. Green, Fairview ; D. DeCourcy, Bornholm ; R. H. Harding, Thorndale ; G. B. Hood, Guelph ; Thos. Teasdale, Concord ; Gideon Snyder, Jarvis ; Jos. Cairns, Camlachie ; Jos. Featherston, Streetsville ; Thos. Brooks, Brantford ; J. L. Jarvis, Paris ; T. A. Cox, Brantford ; H. George, Crampton ; G. Bennett, Charing Cross ; W. Tape, Ridgetown, J. E. Brethour, Burford ; J. C. Nichol, Hubrey.

NEW BUSINESS.

Mr. F. W. Hodson, Dominion Commissioner of Live Stock, suggested that the Association should do something in the way of giving a grant towards paying the wages of a permanent man to look after the cars of live stock being shipped to the West, and on motion of D. C. Flatt, seconded by R. H. Harding, it was resolved :

"That the Dominion Swine Breeders' Association grant the sum of $50 towards paying the wages of a permanent man in arranging and looking after the carloads of live stock being shipped to the West."

On motion of J. E. Brethour, seconded by Alex. Smith, it was resolved : "That the thanks of this Association be tendered to our able and energetic Secretary for the excellent manner in which he has conducted the affairs of the Association during the past year.

The entire oversight of the New Provincial Winter Fair Building at Guelph, has been undertaken and carried out successfully by him, and we wish in this manner to indicate to Mr. Westervelt our appreciation of his untiring efforts in our behalf.

We also desire to bear testimony to the splendid service rendered to the Association by Mr. F. W. Hodson, who in his capacity of Commissioner of Live Stock for the Dominion, has on all occasions lent his experience, his time and his untiring energy to the work of our Association.

The meeting then adjourned to meet at the call of the Secretary.

EXECUTIVE MEETING.

The Executive meeting of the Dominion Swine Breeders' Association convened at the Palmer House, Toronto, on June 27th, 1900, at 4:30 p.m., President W. Jones, in the chair.

The Secretary presented tenders which he had received for printing Volume XI. with reduced pedigrees and smaller type. A discussion arose as to the advisability of printing them in this reduced form, and on the suggestion of the Secretary, it was moved by G. B. Hood, that Volume XI. be printed in the same form as Volume X., and that the Secretary let the contract for printing. Carried.

PRIZES.—It was resolved that the prizes to Winnipeg and Brandon Fairs be given as follows:

Winnipeg.—For best boar any age and best sow any age, a prize of $7 each, to be given in the following breeds: Berkshires, Tamworths, Yorkshires, Chester Whites, Poland Chinas and Duroc-Jerseys. Total $84.

Brandon.—For best sow any age $10, to be given in Berkshires, Yorkshires, Tamworths and any other breed. Total $40.

CONSTITUTION.—According to instructions received at the last annual meeting the Executive drafted the following clause to be inserted in the constitution, on motion of J. E. Brethour and G. B. Hood.

"By virtue of his office, the Live Stock Commissioner of the Dominion of Canada shall be a member of the directorate and of the Executive of this Association, and shall enjoy the powers and privileges of an annually elected director or Executive officer. Carried."

INCORPORATION UNDER DOMINION ACT.—The Secretary read the Dominion Act, lately passed, whereby Live Stock Associations may incorporate with Dominion privileges. On motion of G. B. Hood, seconded by J. E. Brethour, it was resolved: "That the President and Secretary of the Dominion Swine Breeders' Association prepare rules and regulations to govern a Dominion Swine Record Association, and that it is advisable that this Association be organized according to the outline of the Secretary." Carried.

The plan submitted by the Secretary was as follows:

(*a*) Five men to incorporate for Dominion Swine Record Association. All members of the Dominion Swine Breeders' Association to be made members of the Dominion Swine Record Association by paying one dollar per member out of the funds of the Dominion Swine Breeders' Association. Membership to be allowed only in this way.

(*b*) All officers, directors and auditors of the Dominion Swine Record Association to be the same as those of the Dominion Swine Breeders' Association, and when appointed for one shall also be held as appointed to the other.

(*c*) Annual meeting to be held at the same time and place as that of the Dominion Swine Breeders' Association, and the report of the Secretary-Treasurer to be presented.

(*d*) Dominion Swine Breeders' Association to hand over to the Dominion Swine Record Association the Record Funds now in the hands of the Dominion Swine Breeders' Association.

SWINE TESTS.—It was unanimously decided on the suggestion of the President that the Swine Feeding Tests, proposed by the Dominion Live Stock Commissioner, be left over until next year when matters may be more favorable for conducting them.

The meeting then adjourned.

GRANTS TO WINNIPEG AND BRANDON FAIRS.

At Winnipeg, $84 was divided among six classes, $7 being offered as a special prize for the best boar and sow, any age, in each of the pure-bred classes. The prizes won were as follows:

Berkshire Boar	Hon. Thomas Greenway, Crystal City, Man.
Berkshire Sow	Hon. Thomas Greenway, Crystal City, Man.
Yorkshire Boar	W. B. Cockburn, Souris, Man.
Yorkshire Sow	Brethour & Saunders, Burford, Ont.
Chester White Boar	W. McBride, Portage La Prairie, Man.
Chester White Sow	W. McBride, Portage La Prairie, Man.

Tamworth Boar .....W. E. Baldwin, Manitou, Man.
Tamworth Sow.....L. A. Bradley, Portage La Prairie, Man.
Poland China Boar.....W. L Trann, Crystal City, Man.
Poland China Sow .....W. M. Smith, Fairfield Plains, Ont.
Duroc Jersey Boar.....W. M. Smith, Fairfield Plains, Ont.
Duroc Jersey Sow .....W. M. Smith, Fairfield Plains, Ont.

At Brandon, $40 was divided among the four classes for pure breds, $10 being offered as a sweepstake prize for best sow, any age. The prizes won were as follows :

Berkshire Sow.....Hon. Thomas Greenway, Crystal City, Man.
Yorkshire Sow.....Brethour & Saunders, Burford, Ont.
Tamworth Sow.....L. A. Bradley, Portage La Prairie, Man.
Any other variety pure-bred sow...W. L Trann, Crystal City, Man.

MEMBERS OF THE DOMINION SWINE BREEDERS' ASSOCIATION, 1900-1901

NAME AND ADDRESS.	BREED.
Ash, Wm. R., North Ridge	Berkshires.
Agnew & Sons, Robert, Acton	Berkshires.
Anderson, Wm., Duntroon	Yorkshires.
Aitcheson, Wm., Fulton's Mills	Tamworths.
Allison, David, Roland, Man	Berkshires.
Armstrong, A. B., Codrington	Yorkshires.
Arnold, J. B., Easton's Corners	Tamworths.
Burk, John A , Amherstburg	Berkshires.
Bray, James, Longburn, Man	Yorkshires.
Blain, N. M., St. George	Tamworths.
Brandow, A. W., Walsingham Centre	Tamworths.
Baldwin, Wm., Manitou, Man	Tamworths.
Bradley, L. A., Portage La Prairie, Man	Tamworths.
Barr, David, Jr., Renfrew	Yorks. & Berks.
Ball, E. N., Hamburg, Mich	Berkshires.
Brandon, C., Souris, Man.	Berkshires.
Blake, Jr., Thos., Saltcoats, Assa.	Berkshires.
Brander, G , Northport, N.S	Berks. & C. W.
Brander, T., Northport, N.S	Berkshires.
Barron, J. G., Carberry, Man	Berkshires.
Baldeone & Son., Wm., Manitou, Man	Berkshires.
Brethour & Saunders, Burford	Yorkshires.
Bennet, & Pardo, Geo., Charing Cross	C. W. & P. C.
Bennett, Jos., South Buxton	Poland Chinas.
Bennett & Son, H., St Williams.	Berkshires.
Brien, E., Ridgetown	Berkshires.
Birdsall & Son, F., Birdsall	Chester Whites.
Blight, E., Millbrook	Berkshires.
Begg, John, Claire, Assa	Berkshires.
Boynton & Son, P. W., Dollar	Berkshires.
Bowles, Levi, Springville .	Berkshires.
Bow Park Co., The, Brantford	Berkshires.
Brown, F. W., Portage La Prairie, Man	Berkshires.
Bowman, W. R., Mount Forest	Berkshires.
Boyd, Archie, Kars	Berkshires.
Bowman, T. E., Berlin	C. W. & P. C.
Bogart, J. W., Morewood	Yorkshires.
Bonnycastle & Sons, F., Campbellford	Berkshires.
Brooks, Thos., Brantford	Berkshires.
Brien, W., Ridgetown	Berkshires.
Campbell, John, Snellgrove	Berkshires.
Chalk, J. H., Carlton	Chester Whites.
Callbeck, J. W., Augustine Cove, P. E. I.	Yorks. & P. C.
Clark, W. G., Brampton	Berkshires.
Clark, Robert, Ottawa	Yorks. & C. W.
Carpenter, W. S., Simcoe	Berkshires.
Campbell, N., Chatham	Berkshires.
Clark, J. G., Ottawa	Yorkshires.
Cavanagh, Wesley, Frankville	Berks. & Tams.
Campbell, D., Clifford	Berkshires.
Chalmers, Cyrenius, Low Banks.	Tamworths.
Central Exp. Farm, Ottawa	Berks. & Yorks.
Chalmer Bros., Palmerston	
Cox, T. A., Brantford	Berkshires.
Coxe, S. A., Brandon, Man	Berkshires.
Cousins & Son, John, Harriston.	Berkshires.
Connolly, P. J., Middleton, P.E.I.	Yorkshires.
Collwill Bros., Newcastle	Yorkshires.
Coleman, T. J., Markdale	Berkshires.
Cole, T. J., Bowmanville	Tams. & Yorks.
Crowell, W. N., Napinka, Man	Berkshires.
Crozier, A., Beachburg	Berkshires.
Copeland, S. R., Harriston	Yorkshires.
Conroy, R. & W., Aylmer, Que	Tamworths.
Cowan, J. S., Canard, N. S.	
Davis, H. J., Woodstock	Berks. & Tams.
Day, N., Powle's Corners	Yorkshires.
Drake, S. F., Pownall, P.E.I	Chester Whites.
Davis, C. G., Freeman	Berkshires.
Darling, L. A., Morganstown	Yorkshires.
Davis, J. F., Tempo	Yorkshires.
Derbyshire, W. W., Wheatley	
Derbyshire, J. B., Wheatley	
Decker, C. R., Chesterfield	Berkshires.
Dennison, W. S, Dennison's Mills, Que	Chester Whites.
DeCourcy, D , Bornholm	C. W. & P. C.
Dedels, Hy., Kossuth	Yorks & Tams.
Decks, J. D., N. Williamsburg, N. B.	
Denbow, J. T., Deleau, Man	Tamworths.
Dickie, Harry, Warkworth	
Donaldson, James, Dewittville, Que	Tams. & C. W.
Dool, E., Hartington	Berkshires.
Dorrance, James, Seaforth	Berkshires.
Douglas, John H., Warkworth	Berkshires.
Douglas, Hugh, Huntingfield	Berkshires.
Doolittle, Herbert, Hamlet	
Duthie, James, Melgund, Man	Berkshires.
Dunbar, John, St. Marys	Berkshires.
Duck, R. F. & Sons, Port Credit.	Yorkshires.
Dunn, Geo., Laurier	Berkshires.
Duke, David, Burgoyne	Berkshires.
Durham & Cavan, Toronto	Berkshires,
Dulmage, A. E , Oberlin, Ohio.	Yorkshires.
Dunn, Geo , Neepawa, Man	Berkshires.
Dolson, Sam, Alloa.	Berkshires.
Dyment, S. Barrie	Berkshires.
Edwards, W. C., Rockland	Berks. & Yorks.
Edwards, Edwin N., Wiltshire, P. E. I.	Yorkshires.
Evans, John C., Grimesthorpe, Man.	Berkshires.
Ellah, Joseph, St. Marys	Yorkshires.
Edwards, G. A., Kerfoot, Man.	
Elliott, Andrew, Galt	Tamworths.

NAME AND ADDRESS.	BREED.
Elder, James, Virden, Man.	Berkshires.
Endsley, T. L., Charleston, Ill.	Tamworths.
Eickmeier, A. E., Brodhagen	
Fretz, J. A., Pelham Union	Yorkshires.
Fenner, A., Comber	Duroc Jerseys.
Flatt, D. C., Millgrove	Yorkshires.
Featherston, Jos., Streetsville	Suffolks, York. & Essex.
Frank & Sons, The Grange	Suffolks.
Fraser & Son, I. O., Fellows	Duroc Jerseys.
Fahner, Chris, Crediton	Duroc Jerseys.
Fanner, Adam J., Comber	Berkshires.
Frood, D., Renfrew	Berkshires.
Fox, J. P., Winchester	Tamworths.
Fulton, Jr., John, Brownsville	Tamworths.
Graham, A., Pomeroy, Man	Yorkshires.
Graham, A. R., Shanty Bay	Berkshires.
Glass, Charles G., Danville, Que.	Yorkshires.
Glendinning, H., Manilla	Berkshires.
Green, Geo, Fairview	Berkshires.
George & Sons, H., Crampton	Tamworths.
Gregg & Son, H., Salford	Berkshires.
Greenwood, Thomas, Douglas, Man	Berks. & Yorks.
Gemmell, J. D., Egmondville	Berkshires.
Greenshields, J. N., Danville, Que	Yorkshires.
Green, F. L., Greenwood	Yorkshires.
George, E. D., Putnam	Chester Whites.
Greenaway, Hon. Thos., Crystal City, Man	Berkshires.
Gier, Geo., Grand Valley	Berkshires.
Gibson, R., Delaware	Yorkshires.
Gier, J. & W., Grand Valley	Yorkshires.
Gillis, A. J., Muirkirk	Chester Whites.
Gibson, D. J., Bowmanville	Tams. & Berks.
Gough, Ed., Powassan	Yorkshire.
Golding & Son, H., Thamesford	Tamworths.
Gosney, Thos., Miami, Man	Berkshires.
Godard, Charles E., Cobourg	C. W., Yorks. and Berks.
Greff, Israel, Alma	Berkshires.
Hanmer, D. G., Mount Vernon	Berkshires.
Harman, R., Temperanceville	Berkshires.
Hamilton, Daniel, Harriston	Berkshires.
Hauser, Ignatius, Weisenburg	Yorkshires.
Harding, R. H., Thorndale	Chester Whites.
Hawkins, D., Woodville	Berkshires.
Hallman, A. C., New Dundee	Tamworths.
Hartman, J. W., Elmhedge	Yorkshires.
Hart, Alex., Hampstead	Berkshires.
Harris, George N., Lynden	Berkshires.
Hawkshaw & Son, W. S., Glanworth	Tamworths.
Hastie, A. C., Comber	Berkshires.
Hart, Henry, Woodstock	Tamworths.
Haight, J. E., Ninga, Man	Berkshires.
Harper, Horace G., Longford Mills	Berkshires.
Henderson, W. C., Keady	Berkshires.
Herron, Henry, Avon	Poland Chinas.
Hyde, George A., Shakespeare	Yorkshires.
Henderson, W., Thamesville	Tamworths.
Henry, J. R., Chater, Man	Berkshires.
Hill, George, Delaware	Berkshires.
Hill, John, Wellesley	Berkshires.
Hord & Sons, John, Parkhill	Yorks., P. C., Suffolks & Tams.
Hood, G. B., Guelph	Berkshires.
Honey, R., Brickley	Yorkshires.
Holmes, C. W., Amherst, N.S.	P. C. and C. W.
Hoover & Sons, P. R., Green River	Tamworths.
Howe, Wm., North Bruce	Berkshires.
Holland, T. F., Dereham Centre.	Tamworths.
Howard, W. J., Dollar	Yorkshires.
Hoffarth, John, Greenock	Tamworths.
Hogg & Sons, Wm., Thamesford.	
Hurley, J. M., Belleville	Yorkshires.
Hubbard, W. W., Sussex, N.B.	
Hoey, J. G., Elton, Man	Berkshires.

NAME AND ADDRESS.	BREED.
Isaac, John, Markham	Berkshires.
Jarvies, Robert, Nanaimo, B.C.	
Jeffs & Sons, E., Bondhead	Berkshires.
Jones, Wm., Mount Elgin	
Johnston, B., Rodney	Berks. & Yorks.
Johnston, John, Underwood	Berkshires.
Julian, George, Heathcote	Berkshires.
Johnston, A., Vandeleur	Berkshires.
King Bros., Wawanesa, Man.	
Kitching, John, Corwhin	Berkshires.
Kitching, George, Corwhin	Berkshires.
Kerr, R. J., Mimosa	
Keough, J. E., Rockwood	Yorkshires.
King, Oliver, Wawanesa, Man.	Berkshires.
King, J. C., Uxbridge	Berkshires.
Kitson, Wm., Burnside, Man.	Berkshires.
Keays, M. R., Midway, Man.	Berkshires.
Latimer Bros., Arkport, N.Y.	Yorkshires.
Laidler, Jos., Neepawa, Man.	Berkshires.
Lahmer, J., Vellore	Berkshires.
Lang, R. L., Oak Lake, Man.	Berkshires.
Lemon, Simeon, Kettleby	Berkshires.
Lee, J. N., Simcoe	Berkshires.
Leatherdale, Elias, Morden, Man	Berkshires.
Lee & Sons, Dunham, Que	Duroc Jerseys.
Little, John, Henfryn	Yorkshires.
Little, Thos. jr., Kirkwall	Berkshires.
Linton, Wm., Aurora	Berkshires.
Lowe, F. H., Ninette, Man.	Berkshires.
Lougheed, A., Bowden, Alta.	
Logan Bros., Amherst Point, N.S.	
Master, Levi, Haysville	Yorkshires.
Mannerow, A. & L., Desboro'	Berkshires.
Mayloney, F. A., Chapeau, Que.	Yorkshires.
Martin, R. G., Marysville	Yorks. & Berks.
Martin, E. E., Canning	Berkshires.
Mark, Geo. H., Oakwood	Berkshires.
Martin, W. H., Warden, Que	Berkshires.
Major, W., Whitevale	Tamworths.
Meyer, John E., Kossuth	Berkshires.
Myles, J. & G., Heathcote	
Miller, Geo. A., Feversham	Berkshires.
Morrell, F. A., Ways Mills, Que.	C. Whites.
Moody, Ed., Humber	Tamworths.
Murphy, R. G., Elgin	Berkshires.
Murray, Thos., Avonton	Berkshires.
Mutch, J. F., Pilot Mound, Man.	Berkshires.
Murray, G. H., Innerkip	Berkshires.
McAvoy, C. C., Atha	Berkshires.
McCallum & Son, Danville, Que.	Berks. & Yorks.
McKay, J. F., Parkhill	Poland Chinas.
McPherson, Alex., Rutherford	
McEvers, Henry, Teeswater	Yorkshires.
McKenzie, R., High Bluff, Man.	Berkshires.
McGill, J. A., Neepawa, Man.	Berkshires.
McEwen, J., Kertch	Berkshires.
McKenzie Bros., Scotch Block	Berks. & Yorks.
McCreas, A., Merrickville, Que.	Berkshires.
McPherson, John, Campbellton.	
McDonald, W. R., Ridgetown	Tamworths.
McClure, P. A., Meadowvale	Suff. & Essex.
McDonald, J. B., Muirkirk	Berks & Yorks.
McCrae, David, Guelph	Berkshires.
Nauman, A., Fisherville	Berkshires.
Newall, J. R., Crampton	Tamworths.
Neish, R. C., Cannington Manor, Assa	Berkshires.
Nicholl, Robert, Brussels	Yorkshires.
Nicol, John C., Hubrey	Tamworths.
Nichol, Alex., Alexander, Man.	Berkshires.
North, Geo., Marden	Tamworths.
Odell, W. H., Belmont	Tamworths.
Owens, Hon. W., Montebelle, Que.	Tams. & Yorks.
Oliver, Wm., Komoka	Yorks. & Berks.
O'Brien, John, London West	
Plaunt, X., Northcote	Berkshires.
Page, F. E., Mission City, B.C.	Poland Chinas.
Potter, A. B., Montgomery, Assa.	Berks. & Yorks.
Phillips, F. W., Oakville	Yorkshires.

List of Members.—*Concluded.*

NAME AND ADDRESS.	BREED.
Parlee, M. H., Sussex, N.B	Berkshires.
Rettie Bros., Norwich	Tamworths.
Reid, Isaac, Ardtrea	Berkshires.
Reid & Co., R., Hintonburg	Yorkshires.
Richardson, J. A., South March.	Tams. & Yorks.
Rickert, Cyrus, Manheim	Yorkshires.
Rich, W. P., Clark	
Ridley, J. W., Manitou, Man	Berkshires.
Ross, A. W., Douglas	Yorks. & Berks.
Ross, A. W., Bromley	Yorkshires.
Roddick, R. F., Brandon Hill, Man.	
Root, Frank, Pittsfield, Ohio	Yorkshires.
Rogers, L., Weston	Yorkshires.
Rudd, W. J., Eden Mills	Berkshires.
Russell, J. A., Precious Corners	Berkshires.
Runciman, Geo. A., Warkworth.	Chester Whites.
Ruthven, Robert, Blacksburg	Chester Whites.
Robson, J. W., Durban, Man	
Roberts, Harry, Sharbot Lake	Yorkshires.
Rogers, Lewis, Acton	Berkshires.
Rusnell, Frank, Cedarville	Berkshires.
Ruston, J. F., Woodlee	Berkshires.
Shaw, A. J. C., Thamesville	Berkshires.
Shannon, Jos., Cloverdale, B.C.	Berkshires.
Sanderson, George, Colborne	Berkshires.
Standeaven & Son, F., Motherwell.	
Snell & Lyons, Snelgrove	Berkshires.
Semple, J. R., Brule, N.S	Berkshires.
Snyder, Gideon, jr., Jarvis	Berks. and C.W.
Snell, R. P., Snelgrove	Berkshires.
Steffler, A., Formosa	Tamworths.
Stevenson, A., Atwood	Yorkshires.
Steppler, John, Morden, Man	Poland Chinas.
Silverthorn, John, Scotland	Chester Whites.
Smith, W. M. & J. C., Fairfield Plains	Duroc J. & P. C.
Srigley, John, Allandale	Berkshires.
Sieffert, J. H., North Bruce	Berkshires.
Smith & Sons, J., Duntroon	Berkshires.
Simenton, J. H., Chatham	Tamworths.
Sipprell & Carroll, Carholme	Berkshires.
Smith, H. D., Compton, Que.	Yorks. & Tams.
Spicer, John, Yeovil	Yorkshires.
Snyder, L. W., Piqua, Ohio	Yorkshires.
Smith, R. L., Fargo	Poland Chinas.
Stirtzinger, F. H., Fenwick	Poland Chinas.
Smith, James, Harrietsville	
Smith, W. J., Kilsyth	Yorks. & Berks.
Silver, John R., Danville, Que.	Berkshires.
Smith, A. B., Moosomin, Assa.	Berkshires.
Scott, Sam, Stonewall, Man	Berkshires.
Scott, Robt., Calf Mountain, Man.	Berkshires
Snowdon, Sam, Bowmanville	Berkshires
Sutherland, Angus, Eganville	Yorkshires.
Struthers, W. B., Poole	Berkshires.
Styles, W. G., Rosser, Man	
Schnurr, H., Formosa	Yorkshires.
Scanlan Bros., Ennotville	Berkshires.
Smith, W. M., Fairfield Plains	Poland Chinas.
Scott, Jacob, Stonewall, Man	Berkshires.
Shepherdson, W. J., Walters Falls	Berkshires.
Taylor, J. & H., Richmond Stn., Que.	Yorkshires.
Tape, W. N., Bentpath	Duroc Jerseys.
Trann, W. R;, Crystal City, Man.	P. C. and Yorks.
Tapley, Palmer, Mount Vernon.	Berkshires.
Teasdale, Thos., Concord	Berkshires.
Terrell, A., Wooler	Berkshires.
Titmus, Geo. A., Ralphton, Man.	Berkshires.
Tape Bros., Ridgetown	Duroc Jerseys.
Trick, Richard, Wicklow, N.B.	Yorkshires.
Tufts & Son, Robert, Tweed	Yorkshires.
Turner, Richard, Arkona	Berkshires.
Thompson, Wm., White Rose	Berkshires.
Thomson, Jos. Sardis, B.C.	Chester Whites.
Tumelty, W. J., Madoc	Duroc Jerseys.
Vance, R., Ida	Berkshires.
VanTassell & Son, Brandon, Man.	Berkshires.
Vrooman, A., Carthage, N.Y.	Yorkshires.
Watt, J. & W. B., Salem	Berkshires.
Wade, C. A. & Son, Sarnia	Berkshires.
Wells & Son, A. C., Chilliwack, B.C.	Berkshires.
Wright, W. E., Glanworth	Chester Whites.
Wilson, Mrs. A. J., Pittsfield, O.	Yorkshires
Willis, R. jr., Glen Meyer	Poland Chinas.
Wright, Robt., Binbrook	Tams. & Berks.
Wills, Henry, Winger	
Whitman, Sam, Souris, Man.	Tamworths.
Wood, James C., Longbank	Yorkshires.
Wallace, R. A., High River, Alta.	Yorkshires.
Wilson, P. H., Chilliwack, B.C.	Berkshires.
Yuill & Sons, J., Carleton Place.	Berkshires.

ONTARIO PROVINCIAL WINTER FAIR.

JOINT PUBLIC MEETING.

A public meeting in connection with the Ontario Provincial Winter Fair was held in the City Hall, Guelph, on Wednesday, December 12th, 1900, at 7.30 p.m.

Mr. D. DERBYSHIRE, who occupied the chair, said, in opening the meeting: I feel greatly honored at being chairman of this agricultural meeting. This royal city has done itself honor in the way that they have taken care that the building should be ready for this show; it is a credit to the Province; and the exhibit is such as we might well feel proud of as Canadians. It augurs well for agriculture that there should be such a representation of stock and such a representation of men from all parts of the Dominion. I am delighted that we have taken hold of this matter in an organized way of late years, not only in connection with our stock, but other industries connected with agriculture as well. We can easily see the result. We feel proud to have the Ministers of Agriculture for the Dominion and for the Province with us. There was a time a few years ago when men who belonged to the agricultural classes were not looked upon as of much account. We are bringing ourselves to the front and letting people know that upon our efforts depends the success of other classes of the community. We feel proud of what we have been able to accomplish, not only in connection with the stock business, but in butter and cheese, poultry, and every other line of agricultural industry. We feel proud of the unprecedented record of the cheese business during 1900. Never have we made such cheese, or put it on the market in such fine condition, or made so much money as we have this year. The stock exhibit at this show is a record breaker.

I am delighted to see the Mayor of this city here. He has exerted himself to give us the facilities for this exhibition, thus promoting the welfare not only of the citizens of Guelph but of the whole Province.

ADDRESS

BY R. E. NELSON, MAYOR OF GUELPH.

It gives me great pleasure to comply with that request and to extend a cordial welcome on behalf of the city of Guelph to those who are here attending the Winter Fair. In doing so I feel all the more gratification because I am welcoming you to your permanent home. It is with a feeling of pardonable pride that I refer to the building that has been erected for your accommodation. It may not be out of place for me to give you a little history of that undertaking. When it was reported that the fair was to be located permanently, the members of the Guelph Fat Stock Club, the City Council, and the members of the Board of Trade appointed a committee to wait upon the stock associations and the Minister of Agriculture, and to impress upon these gentlemen the suitability of Guelph for the Show's permanent home. Financing the scheme was no easy task. The City Council, the Fat Stock Club and the township councils all came to our aid, as did also the Government and the Stock Associations; but the city provided the sinews of war to the greatest extent. We are very glad that we have been able to get the building sufficiently completed to hold the show this year. Another year I have no doubt you will find that the finishing touches have been put on it. I believe the Show is a splendid investment for the city, and a magnificent investment for the Province and for the whole Dominion. We have an evidence of this in the representatives who are here to-night from the Maritime Provinces, from Manitoba and the Northwest, and from other parts of the country. It fills me with pleasure to stand here at the conclusion of the 19th century, and see that agriculture has taken such a step forward; and I am glad that it is my privilege to meet such an intelligent and splendid looking lot of men as we have here to-night.

I feel that it is only becoming of me as a citizen of Guelph to say a few words with regard to our friend who departed this life just before this fair was held. I refer to John I. Hobson, a gentleman whose name had become a household word all over the Province. It was to his heroic efforts that we owe the location of the Show in the city of Guelph.

No one took as much interest in the erection of the building as he did. Day after day I met him inside the walls observing the progress of the work, and looking forward to the time when he should meet his many friends from all over the Dominion within its walls. Just before its completion, he was called to his long home. I feel that I owe it to Mr. Hobson in my own behalf, in behalf of this city, and of all here present, to express our indebtedness to our departed friend.

It gives me very great pleasure to extend to you all the heartiest welcome within my power to this royal city of Guelph.

The CHAIRMAN: I am sure anyone visiting the stock show this afternoon would have found everything looking familiar except for the absence of the form of our late friend, Mr. Hobson. No man's ability has been recognized more than his, and if it had not been for his efforts the permanent location of the show would never have been completed.

THE GOOD WORK OF LIVE STOCK ASSOCIATIONS.

By DR. JAMES MILLS, PRESIDENT O. A. C. GUELPH.

I need scarcely say to a Guelph audience, what we all know to be true, viz, that farming is the foundation industry of this country. Hence the importance of this meeting. The erection of our immense new Fair Building and the establishment of the Provincial Winter Fair in this city constitute an epoch in the agricultural development of the country,—something to be looked back to and talked about.

The present dimensions of the show are largely due to the persistent efforts of our Live Stock Commissioner, with the Live Stock Associations and a progressive, liberal Department of Agriculture at his back; and the erection of so large and expensive a building is the result of enterprise, pluck, and energy,—first, on the part of our County Council, which did so handsomely in granting $4,000; secondly, on the part of the Guelph Fat Stock Club, which contribute about $500; thirdly, on the part of our town ship municipalities, which assisted by smller grants; but especially on the part of the Mayor and Alderman of the city of Guelph, who had to raise the greater part of the money required and to superintend the construction of the building.

The very gratifying outcome of our efforts on agricultural lines goes to show what can be done by through organization and intelligent work, with enterprising, judicious, and energetic leadership.

The first thing which I would refer to under this head is the growth and work of the Live Stock Associations.

The Growth of these associations has been very remarkable. Eight years ago, the live stock associations had a membership of 15, and the annual receipts amounted to $15 To-day the membership is about 2,000, and the annual receipts of the Cattle, Sheep, and Swine Breeders' Associations amount to $7,224. The membership now embraces most of the prominent breeders of pure bred stock in Ontario.

The Work undertaken and accomplished by the associations has been of the greatest value to farmers and breeders throughout the Province.

(1) *The very largest concessions obtained from the railroad companies.* For many years, the charges for carrying live stock from place to place in this country were so high that only very little trade could be done between this Province and the more distant parts of the Dominion; but by the wise and persistent efforts of the late secretary. F. W. Hodson, backed by our Live Stock Associations and our Provincial Minister of Agriculture, concession after concession has been obtained, little by little, until to-day pure-bred animals are carried at half rates between all points west of Montreal; and car-load lots are carried at the same rates as settlers' effects between points in Ontario and points west of Fort William,—no trifle, I assure you, for where it formerly cost $30 to $120 to send an animal west, it now costs $10 to $18; and it has proved a great benefit to all concerned—to buyers, settlers, and the railoroads, for it gave such a tremedous impetus to the trade between the east and the west that over $500,000 worth of pure bred animals have gone from Ontario, chiefly to the west, since the change in the rates.

(2) *Provincial Fat Stock Show.* In 1892, the Association took a controling interes in this important exhibition. In 1891. there were 91 entries, $102 were received a

entry fees, gate receipts were $86, and the total sum paid in premiums was $325. In 1898, there were over 800 entries, the gate and entry receipts were $1,100, and the amonnt paid in prizes was $4,500. Last year, the sum paid in prizes was over $5,500; and two new features of great importance were introduced—I mean the block test and lectures by expert judges. The dairy section also was added a few years ago and has become a very interesting and important department of the show.

(3) *List of Live Stock for Sale.* List of live stock for sale by members of the associations have been published regularly since 1897 in the *Agricultural Gazette*; and these lists have been of very great benefit in bringing buyer and seller together. They have been placed in the hands of stock breeders throughout Canada and in the border states, and have been sent to the secretaries of Farmers' Institute. These lists have been advertised in widely circulated papers, and the results have been of inestimable value to all concerned.

(4) *List of Stock Bought and Sold* have likewise been published and sent out from week to week, all for the information and guidance of buyers and sellers.

(5) *The Farmers' Institute.* The progress of this very important organization during the past few years has also been very great. I need not go into the question, for it is well known to all. The present membership is about 17,000.

I must not, however, continue further on this line, I shall simply unite with the Mayor in welcoming the farmers and all others who have come to attend our Winter Fair especially the live stock men of this and other Provinces; and, in doing so, we think we are welcoming a very intelligent and progressive class of our people; for I may say that an extensive acquaintance with this Province long ago convinced me that the most intelligent lot of men we have, and the most propressive class of people in the farming community in this country are the live stock people and the fruit growers. Any man who has gone through the country attending institutes as I have done, would be forced to that conclusion; and the most backward all over the Province, generally speaking, are the men who have been confining their attention to the growing and selling of grain. I have pleasure in welcoming especially the live stock men of this country.

I want also to support the Mayor in a word of exceptional welcome to our friends of Maritime Provinces. I think it is due to our Live Stock Commissioners that between fifty and sixty of them have come up. I know our people will extend to them a royal welcome. Nothing in connection with this show has given me so much pleasure as that one thing—to see so many come so far at so great an expense to see what we have to show them here and make our acquaintance. I visited the Maritime Provinces some time ago, and in looking over the columns of the local papers I found that the news items had much to do with Boston and the Eastern States, meaning I suppose that their daughters had married American husbands. I was surprised at it. Well, we have husbands for them up here,—good fellows too, and what is more, we have wives for their sons right here in this Province. There was a writer who said

> "Go search the world and search the sea,
> And come you back and sing with me
> There's no such gold and no such pearl
> As a bright and beautiful English girl."

Fine as the English girls are, we have something better here, better than the Scotch and better even than the Irish. (Laughter). We have here such a happy combination of them all, that I think I must paraphrase that stanza and say

> There's no such gold and no such pearl
> As a bright and beautiful Ontario girl.

OUR GREAT LIVE STOCK INDUSTRY.

HON. JOHN DRYDEN, MINISTER OF AGRICULTURE FOR ONTARIO.

If you will pardon me, I shall not address you to-night in my official capacity; I shall not speak as head of a Department, but as one of the stockmen gathered here. In behalf of the stockmen of Canada I accept very gratefully the hearty words of welcome we have heard from the Mayor of this city and also from Dr. Mills. I want to say to

them that the stockmen are proud of the city of Guelph, and proud of what she has done in connection with this great show in providing the facilities we have here. A few years ago it did not take a very large space to accommodate the Fat Stock Show. We have now grown so large and spread ourselves so far east and west and north and south, and have gathered our people and our live stock together in such large numbers, that it has been very difficult anywhere in this country to find such accommodation as was needed. We had fair accommodation in the city of Brantford, but that building was removed from our grasp. We went to London, and the London people did the best they could for us, but it was beyond their reach. Then we began to see that we must somewhere find a permanent home. The city of Guelph, seeing the situation, came forward. This plucky city, this royal city, said to us, "Come and make your abode with us, and we will guarantee to make you comfortable." At first we were a little shy, like those Ontario maidens that Dr. Mills referred to. We scarcely thought they were capable of such an undertaking. But we listened patiently to them and their request, and after awhile, we very modestly, as usually occurs in such cases, said "Yes," and I may say that the city has kept absolutely the promises they made to us.

In doing so, I want to say that they have made this city the live stock centre of Ontario; and more than that, they have made it the live stock centre of the Dominion.

I do not think they quite understood how extended the influence was to be when they undertook the matter. I want to say further that there is not a flock or a herd within twenty miles of this city that has not had added to its value because of this exhibition from ten to twenty per cent. at least. You cannot understand the extent of this influence, and it is but the beginning of greater things. The first thing I should like to see somebody do in this city is to undertake to provide a greater amount of hotel accommodation for these people when they come here. (Applause.)

I should be happy indeed to-day did I not feel that the live stock industry has lost one of its best friends in the late Mr. Hobson, to whom the Mayor has so touchingly referred. He was a man who, with time to spare, was willing to devote it unselfishly to the objects we have in view. Agriculture had no better friend than he. We are all saddened when we think that he is not here to enjoy the full results of his labors in connection with the enterprise of erecting this grand building.

But it is not the stockmen alone who are profiting by this show. The poultrymen of Ontario found themselves somewhat in the same predicament as the Live Stock Associations. Nowhere had they adequate accommodation for their exhibition. The city heard of what was needed and came forward and said, "We will accommodate the poultrymen, too, if the Poultry Association will join with the Fat Stock Show." I was delighted when I heard it. Now there is not a poultry man in the Province who is not tingling with delight because that was done. They have here in connection with this building such accommodation as I venture to say cannot be found anywhere. I do not believe that the poultrymen have such a home, outside of the city of Boston, in North America. That is saying a good deal.

I am sorry that I am not permitted to see on the platform my chief, Hon. G. W. Ross. He promised me to come here. But he went to a banquet last night. He does not drink anything but water, but I expect it was ice water (Laughter). I am sorry, because I wanted him just to look into the faces of the intelligent, brainy stockmen of this country. Dr. Mills was right when he said "They are the best of them." They are. I wanted Mr. Ross to come into the show and see the result of their skill and energy. I wanted him to come and see what we are giving to the country for the money the Legislature votes for this purpose. Sometimes he thinks I am stretching my imagination a little when I tell him of these things, but I know that if he were here he would tell you that the half has never been told him, I expected to take him to the show to-day with its thousands of visitors, and the grand stock, and let him gaze on it for the first time. It was a revelation when I first took the Hon. Mr. Hardy to the show in Brantford, and I have no doubt it would be the same with my present chief.

I am glad we have so many representatives from the far east. It was recently my privilege to take a trip there, and I found there some of the most intelligent men I have met anywhere. I found a lot of people who are looking for information and are saying "Can't you help us." I said, "Yes we can, and if you don't believe it come and see for yourselves; and the end of it is they are here—a car load of them. (Applause).

They say this Province is the "Banner Province" of the Dominion. If we accept the honor we must be ready to accept the responsibilities. We have not hesitated to accept them, and it is not too much to say that we are leading the procession. We are showing the way; and while we are doing so, we are reaching out our hands to the right and the left and saying to these people in the west and down by the sea, "Come you and join us; for are we not all Canadians, and must we not stand or fall together?. We want you to join us. Help us and we will help you."

I want to say that the stockmen are making a distinct advance in exhibition work, because of the education that is being afforded in connection with this Show. The ordinary agricultural exhibition presents the ideals towards which we are to reach. Here we are taking steps in advance of that. We are making the judges the educators of the people and having them explain why we are to produce this or that. We are trying to show the people why certain ideals are right, and why something else is wrong. Then we go a step further and try to tell them how that can be produced. This is a distinct advance. We are combining the ordinary exhibition and the Farmers' Institute Our exhibitions have done a great deal of good in the past in presenting these ideals, but the Farmers' Institute came along and showed how to accomplish the results. We are here combining successfully these two things. I want to venture this phophecy, that the twentieth century will not have gone very far till we shall find these principles generally adopted. Instead of the rope-dancer and the mountebank performer at our exhibitions, we shall have something along educational lines which will be a thousand times more attractive. (Applause).

The possibilities of the live stock industry are immense. Our soil, our climate, and our people are all admirably adapted to achieve the very best results. I have been reading in the newspapers letters from prominent men who say that we cannot compete with our friends to the south We can compete with them. For forty or fifty years this Province has been the centre of the cattle and sheep industries of North America. At this very time we are sending to the United States the cattle that are to be the foundation upon which they build the structure which they boast so much about. Do not tell me that the farmers of Canada cannot produce as good animals as they can in the United States or in any other country. We have at this show the proof of what I say, and we had at Chicago, at the Fat Stock Show there, the proof of what I say. If you study the history of the cattle that won the prizes there you will see that the large percentage came from Canada. We can compete; but we shall have to have the trade more or less centred before we can do our best; and when it is once centred as it is in Chicago, you will find how rapidly we shall grow. It is a downright shame that our leading hotels in our large cities have to go to Chicago for the meat they put on the table. They are obliged to go to Chicago because there they get a continual supply of what they want. I shall not rest content until somehow we have inaugurated a system that will give us the advantages they occupy there. (Applause) The trade in live stock in Chicago—I was astonished when I heard the statement the other day—is greater than the sum total of all the other businesses of the city combined. What do you think of that? And then talk to me of the possibilities of this great industry,—about the advantages of cultivating this industry. We are on the right track. We have gathered our people together. We have gathered our eastern and western breeders, and we shall unite and accomplish great results. Our bankers are interested our railways are rendering assistance.—and you can not reach them in any way except to show them that what you propose is in the interest of the country and will increase the trade of the country. With all these influences brought to bear, we have a right to expect even greater progress in the near future. (Applause)

Hon. Mr. Ferris, Commissioner of Agriculture for New Brunswick: I wish first to thank you for the hearty welcome we have received here. We in New Brunswick have not given the attention to agriculture that you have. We are more of a lumbering province, and our people who do farm, have a fairly good market in that direction. We are beginning to feel, however, that it will soon be necessary for us to turn more attention to agriculture on more advanced lines. One reason why we are here is to gain information that will be of use to our people in this connection. We feel more than delighted with our visit here. We have been so hospitaly received and so welcomed that I am sure you will see us back again. We hold meetings of our farmers and dairymen

every year, during the session of the Legislature, and we should be delighted to have your people come down at that time. You will find we have a pretty good Province. We feel proud of it. While not so advanced, we have some advantages that you have not. We live right at the sea board, and we shall have a chance to compete with you as we are nearer the European markets.

THE CHAIRMAN: For the information of our friends here I should like to say that they have made some fine cheese in New Brunswick this year, as fine as has been made in any part of the country except in the Province of Ontario. (Applause.) That is saying a good deal. These gentlemen would like to make you believe that there is no—one in the country except themselves. We feel proud of the efforts of the stockmen, but the men who have made the name of Canada famous are the butter and cheese men of this country (laughter and applause), and the dairy industry will continue to be the leading industry in spite of all the efforts you can put forth. When you can show exports to the value of twenty-five and a quarter millions we will begin to talk to you. You are as near to an audience of a real bright dairymen's associations as anything we have had the pleasure of looking at. (Laughter).

Mr. F. L. HAZZARD, PRINCE EDWARD ISLAND: It is true that in Prince Edward Island we have an agricultural country, but we are not an agricultural people in the full sense of the word. We are, however, trying to take advantage of all the information we can get from the gentlemen you send among us. This year our good friend Mr. Hodson came down to enlighten us a little on matters connected with the live stock industry, recommencing the organization of our people as a preliminary step, and I have no hesitation in saying that it is the best step that has been taken by our Province for some time. It is not long ago,—about 1890,—when our first cheese factory was established. But we accepted the advice of Prof. Robertson, and are now following the lead of Ontario in the matter of dairying. This year the butter and cheese output of Prince Edward Island will amount to $800,000. This may seem small to you, but you must remember that the population of our Province is only 112,000.

Mr. E. B. ELDERKIN, SECRETARY MARITIME STOCK BREEDERS' ASSOCIATION: I want to tell you something about the Province of Nova Scotia. It has been a surprise to me how little some of your intelligent people know about our Province. We feel that we have just as much reason to be proud of Nova Scotia as you have of Ontario. We feel that possibly you have a right to extend us quite a warm reception up here, for we have been purchasing your produce in large quantities. We have been getting our beef, our turkeys and geese from this Province. One firm in my city pays $200,000 a year for beef to the farmers of this section.

We look upon Nova Scotia as the front door of Canada. Its rockbound shores form also the breakwater of Canada. For ages they have held back the angry waves of the Atlantic. Those rocks, too, are seamed with gold. While you boast of your magnificent agricultural wealth, we can boast of our magnificent mineral deposits. Canada has obtained a national reputation from the coal of Nova Scotia. We have coal from one end of our Province to the other. We also have immense iron deposits. We have established an iron industry at Sydney that in eighteen months have involved an expenditure of $8,000,000, while the population of the town has grown from twelve to twenty thousand. Every where towns are rapidly growing in to cities because of the coal and iron and gold, and because of the industries that they bring into existence. Sydney will be the Birmingham of Canada. We are creating a demand for the products of the soil that you have been sending. We are making money out of building ships, sawing logs, and out of our mines and fisheries. But we have a variety of agricultural resources also. In some things you may beat us at present, but not in all. We produce the finest Gravenstein apples in the world. In our famous Annapolis Valley we have discovered that we can grow peaches even, and I believe that the time will come when that valley will rival the Niagara Peninsula itself.

Before I close I want to say that we invite you to visit us. We have come up here to give you a chance to see what we look like—to see whether we are civilized. We want you to come and see us in our homes. We belong to Canada. Those to the west of us have in the past been isolated because of the feeling existing in the different Provinces, but this is gone and gone for ever. (Applause). Our boys dug its grave with bayonets on the African veldt, and it will never come back. It is for you and for us

together to bring to bear our best energy and thought for the development of this Dominion. It is our duty to our country and to the generation that will follow us. I believe as I look into the faces of this audience that we are going to do it. (Applause)

LIVE STOCK DEVELOPMENT IN CANADA.

HON. SIDNEY FISHER, MINISTER OF AGRICULTURE FOR THE DOMINION

It has been my good fortune for many years to participate in these shows. For the last three years I have attended similar shows in other cities. They were successful and pleasing to go to; but I must congratulate the live stock industry of the Province of Ontario that now these associations and their show have obtained a permanent foothold in your royal city, and that such a commodious building has been placed at their disposal. I am glad to know that you have associated with you this year the poultry men of the Province. The poultry interests of Canada have been large for many years. They have figured largely in our exports, especially as regards egg production. Of late more prominence has been given to the production of poultry meat. I am glad to know that the poultry meat is to take its place among the live stock. I trust it is a good omen for the future, and that we shall no longer have to be content with skinny birds on our tables, as in days gone by. Our cattle, sheep, and swine breeders and feeders have been giving us fat meat, but not many of our poultry men have been giving us fat poultry. I have felt this so strongly, and saw such a prospect of a possible development of a new trade—or the development of an old trade into a new condition, that I have gone to no little trouble to try to bring about some improvement. As yet it has not progressed so far as I should like. Even this fall a large number of dressed poultry have been shipped to the Old Land without going through the fattening process—which is a very profitable part of poultry production. I do not wish to insist on the cramming of poultry as by any means a necessity to poultry fattening, although from experiments that have been tried, it is evidently the most profitable. I wish to impress upon the poultry men and upon the farmers that if they wish to receive a profit from this branch of their business, they absolutely must finish their birds in the same way that they finish their hogs, cattle and sheep Our farmers are losing the cream of their profits because they sell their birds in a half finished state.

This brings me to another thing, which is the quality of our beef. I come to this show and see splendid animals, perfectly finished, but when I go to the hotel table, or amongst my friends, I cannot find the cuts off these finished animals Where do they go? I go across to the United States, and even in the second and third class hotels I find invariably the highest quality of beef. Our American friends are well up in this matter. As Mr. Dryden said, our stockmen have been able to lead the van and beat our American cousins when they have come into direct competition with them That is true, and yet I cannot understand why it is that when they place the finished food on the table before us, they have something better than you seem to be able to supply. I believe the reason for it is that the farmers are in too great a hurry to get rid of their beasts. They are not patient enough to wait till the animal is really fit for the block. This is short-sighted, and discredits our country and our live stock, but more than that, it prevents your filling your pockets with money as often as you might do. The last couple of hundred pounds put upon the fat ox is the cheapest meat of it all. It adds to the value of the whole former production. Why don't you do it? Many do; the most successful and the most money making of the feeders do it; but they are few and far between; the majority of our farmers do not do it, and lose money thereby. You know how to do it and do it well, because I see in the ring of every show I go to the product of your skill and knowledge—animals that are finished to the highest extent; but the ordinary average animal that you take to the butcher is not finished I must ask therefore that our farmers and stock men do this themselves and impress it upon their neighbors. I must ask the Farmers' Institute workers in this audience as they go through the Province to impress this fact upon their audiences.

Kindly reference has been made to my work as Minister of Agriculture. I venture to say that there is no part of the work which is of more importance to the people of this country than that in which I am engaged in connection with the live stock interests.

There is an old saying that live stock is the foundation of the fertility of the soil, as well as being the finished product of our crude production. If we wish to develop agriculture and make our land more fertile and at the same time to give the farmer an opportunity for exercising his greatest skill, it must be in connection with live stock.

You in the Province of Ontario have accomplished great things, as exemplified here. You have placed your Province at the head of the live stock industry of this continent. As Minister of Agriculture for the Dominion, it seems to me that the rest of the country must be brought up to the level to which you gentlemen have attained. This is my duty, and I believe it to be in the interests of the Dominion to do so; and also in the interests of the Province, because I am satisfied that if Nova Scotia and New Brunswick, Prince Edward Island, and the west attain to the same high level that you have attained to in live stock production, you and your business will be the better therefor. Do not be alarmed if other Provinces move towards excellence in the lines that you have adopted. It will not take away from your prosperity. There was a time when the cheese industry of Canada was confined practically to Ontario. There was some little grumbling when the Dominion Government took measures to extend it to the Maritime Provinces. After we had established the industry in the eastern Provinces, there was still more uneasiness when we began to establish creameries in the North-west. Well, the dairy industry has been established both in the East and the West. But has Ontario suffered? The cheese and butter industry of this Province never yielded greater profits than it is yielding to-day. So it will be if these outside Provinces can be brought to the same high pitch of perfection in regard to live stock. To this end I have secured the services of Mr. Hodson as Live Stock Commissioner—a gentleman who has been identified with the progress of this work here. Mr. Hodson has been sent to the Maritime Provinces and to the West to assist in organizing the stock interest in those sections as it has already been organized in this Province. Something has already been accomplished. The desire to improve the herds of pure bred stock that already exist in the Maritime Provinces has been stimulated; what the people there could not well have done individually, they are now endeavoring to do collectively. One indication of the result of the movement is found in the presence here of a large delegation from the Maritime Provinces. I know you will be glad to welcome your brothers from the east and west, and give them a helping hand. Ontario is the centre of the Dominion; it is the centre in population, in material development, and probably in intellectual development; but down by the sea we have a great portion of our country; it is a good country and a rich country, and has all the necessary material conditions for the development of a great agricultural industry; and it has perhaps as no other Province, a home market which is most necessary for the development of an agricultural industry.

On the bundless plains of the west, they have a large development of agricultural and stock industries already, but it is small indeed to what it will become in the century that is before us. I have no hesitation in saying that in the Great West there will be built up a live stock industry—not simply a ranching industry—but on the same lines and under about the same conditions as you have here. When that come about there will be millions of cattle, sheep, and horses where to-day there are only thousands. But you need not be afraid; you have the stock, and you have the conditions, and will always take the lead if you are true to yourselves. I know you well enough to know that you will be, In our country we have one of the greatest heritages on the face of the earth; it has come down to us from the men who developed the old wilderness. We are on the advent of a new century; let us not forget our responsibilities, or forget that the most important factor in the development of this great country must be the industry of agriculture. It is on you that the responsibility of continuing this progress is placed. It is in your hands and therefore you must see that it is done well and worthily.

I am glad to see such a large gathering here to-night, and to be among you; and especially glad that from now forward, this city is to be the permanent home of this great organization which is to have such an important bearing on the progress of our country in the future.

ILLUSTRATED ADDRESS ON THE BACON HOG.

By J. E. Brethour, Burford.

To illustrate this lecture Mr. Brethour selected three hogs from the animals present at the Show and introduced them to the audience. The first approached the ideal of the type and form of pig necessary to produce first-class bacon for the English market. The second, while of the right type, was unfinished. The third was of the broad, thick, fat-backed type not in demand.

In judging a hog, Mr. Brethour pointed out that when an animal was firm and mellow to handle, it was in good condition, but when it handled hard and harsh, it was unfinished. If on the other hand, it handled soft and flabby, it was what is termed "overdone."

The desirable type of hog should have good length showing sides inclined to be flat. The ribs should be sprung fairly well from the back. You want a slightly arched back. If you have a flat back you have a fat pig. If you get a pig hollow in the back, you surely get the fat distributed away from the back and filled in along the side. The idea is to get the flesh evenly distributed all the way along, so that when the carcass is dressed, it is not one half fat. The flesh should be firm,—not hard and stringy. In the latter case you are likely to get a pig that is an old one held back and not in proper bloom. You want good hair without the bristles being coarse. A curly coat is not generally desirable. You usually get thicker hair with a curly coat than with a straight one.

The desirable type of hog is well covered over the loins, with smooth even shoulders not wider than the loins; neck not long, but muscular, without crest of fat. The under line and upper line should be parallel, showing evenness of depth through heart and flanks. The hams should be nicely tapered without bulging behind, indicating a lean, fleshy ham, well down to the hocks. The flesh should show no looseness or flabbiness about flanks, ham, or belly, the latter showing trim and straight underline. The head should be smooth not carrying any superfluous fat about the jowls. The face should have an intelligent expression with good breadth between the eyes, showing well developed skull.

The undesirable type is the broad, fat pig. It has any amount of width in the front, which is very undesirable. It will not gain in weight any faster than one of the more lengthy type. He has a very round carcass—not flat sides like you see in the bacon pig.

Q. Where is there a market for that kind of pig?

Mr. Brethour: Very little market except in the States where they make it up into butterine. The premium that Canadian pork is receiving over American is an indication that we are working along right lines. This is an extreme pattern of a fat hog.

Mr. Wilson: Lard is selling at 9½ cents a pound at present, which is very good price. It usually sells at 7 and 7½—that is rendered lard.

Mr. Brethour: It would take a good many pounds of unrendered to make a pound of rendered. There is a good deal of waste is there not?

Mr. Wilson: Yes; that would have to be considered.

Mr. Dryden: What is good bacon worth; you have said what lard is worth.

Mr. Wilson: All the different parts of a hog to day are worth more money than usual. You will very likely see lard lower again.

Q. I saw a man ship a car load of hogs this morning. Some were thick and fat and others long and lean. They were all the same price. Everybody gets alike for their hogs. As long as the buyer does not discriminate, the farmers will raise the ones that will give the most pork for the least feed.

Mr. Brethour: The men who do that are not looking far into the future. There is a certain demand for al kinds, but it is only limited for the fatter kinds. If everyone followed that line and all raised fat hogs, we should soon destroy our market in England. When I was there in 1898, I heard very flattering reports of our bacon. They said our class of pigs was getting better each year, and it was entirely owing to the introduction of bacon hogs into our country.

Q. If the buyers will give as much for one class of hog as another, are they not injuring their business and encouraging the farmers to produce what they do not want?

Mr. Brethour: They are not doing that in all cases. If I had a hog like that, I should have to make a discount on it. I recently had to ship a few under weight in order to prevent them being too fat. We carry them from 170 to 190 lbs. We never

allow them to get too fat. We take out a load when they get uniform and in right condition.

Mr. FITCH: When these animals were shipped this morning they were as I say, some fat, some lean, and all kinds. Every man got $5.60. This is not fair. If you have an extra good steer you will get seven cents a pound; another man who has a middling steer will get only four. This is what they should do with the hogs.

Mr. JACKSON: I have had a good deal of experience in the shipping of live hogs It is very true about the price being the same for all classes and conditions. This we know is wrong.

A BUYER: We are not all to blame. When we take a carload of hogs to the packers, they put them through the culling process, and cull everything that is not desirable for for English bacon, and we get from 50 to 70 cents per hundred less for them. If we have suffered a pretty severe cull for a week or two, we go back to the farmers and are pretty particular. We are that way as long as all the other buyers in a section do the same. But in a little while competition becomes closer. First one buyer and then another takes a few that he knows are not right. To keep his trade with a farmer, the buyer will often give too high a price on some occasions. I live in Brantford where there was a small packing house started last January. I had the job of buying their hogs, and we were to buy them subject to culling at the factory, the same as other factories cull from the drover. All went well for a time, but in a little while hogs got scarce, and rather than miss a purchase, the drovers said to the farmers, "We will give you the top price for your fat hogs, and ship them away and not send them to the Brantford factory." It is only a temporary gain for the farmers. It is bound to act as a boomerang as it encourages the breeding of an undesirable class of hogs. As soon as the farmer can be persuaded to take only what the hogs are worth, the trade will be on a better basis. At present good ones have to suffer for the dock on the bad ones.

Mr. BARBER: The hog business is rather a strange business, and to speak plainly we have rather a strange lot of people to deal with.

Mr. DRYDEN: Do you refer to the packers or the farmers—which?

Mr. BARBER: I have shipped a great many from Guelph and other points, and the farmer may say that we pay prices for the culled hogs the same as for the bacon hogs, but if so, it is the drover that suffers, not the farmer. A couple of years ago we insisted on having the right kind of hogs at Guelph at the right price. With few exceptions the farmers would say, "If you cull out my fat hogs, do not come here any more to buy." The drovers have done the best they could, but it is something that is hard to manage. If the packers would select the hogs on the scale for a couple of years, the farmers would become educated, and the hog trade become more profitable with the farmer. There are several farmers in this neighborhood doing their best to raise a model hog, and they are satisfied to take a model-hog price or the price of a fat hog, and it pays them to do so. Even to-day the packers are not as particular as they should be. I said to a packer a few days ago that it was a serious mistake to make all classes of hogs the same price. There is not half a dollar difference between a model hog, a light hog, and a fat hog. We try to buy the model hog at the model price, and the cull hog at the cull price. If we buy hogs that are not model hogs and pay the top price, we are the parties that have to suffer.

Mr. DRYDEN: So you ought to suffer.

A MEMBER: I should like to say that these gentlemen who buy our products are the best educators we have in the country. They can educate the farmers faster than Mr. Brethour can here. If they say we will take any hog at the same price, you cannot educate the farmers to give you the right thing; there is no use talking. If the buyers would only hold their ground and give us a discriminating market, we should have some encouragement to produce the best article, and the farmers would do it. But they will not take the pains and trouble to produce something they cannot get a cent more for.

Mr. DRYDEN: Mr. Barber says he has bought for two years according to quality. Have the hogs improved around here?

Mr. BARBER: The hogs in this neighborhood within the last five years have improved wonderfully without any doubt. Last week we had about 300 hogs. We had only seven or eight heavy hogs, and three light ones in the lot. There was a difference of twenty-five cents per hundred between the right and wrong kinds. I have taken cars of hogs on which the cull would amount to $80 on a double deck. The cull last week amounted

to only 36 on three decks of hogs—300. It is very hard to deal with all classes of farmers because there are some who seem to think they should have as much as their neighbor when their hogs are not worth it.

Mr. DRYDEN: We are not particular about that kind of farmer at all,—it is the other man we want to help.

Mr. BARBER: The objection is often made that there are too many buyers on the road. If you leave a lot of hogs with a farmer for five cents a hundred, the next man who comes along say, "I will take them as they are;" so that in order to hold your ground, you often have to pay more than the hogs are worth, expecting to make it up some other time when the competition is not so keen.

Mr. WILSON: I have pleasure in endorsing a great deal of what has been said. We say that the drovers have a good deal to answer for because they buy all kinds of hogs at the same price. We have inaugurated a system around Ingersoll under which we pay our buyers a salary. They must then follow the instructions we give them whether they buy a hog at all or not. The result is the farmers in that vicinity sell their hogs when they are ready. As representing the Ingersoll Packing Co., I say that we have not paid the same price for fat hogs and lights as we have for bacon hogs. Under the ordinary plan, the drovers go around the country and buy all the hogs at the same price. They are taken to the packing house and culled and the drovers have to suffer. The competition in Canada is so great that the full price is paid on all occasions. The trouble is, the market is too erratic. Hogs now are running pretty fat and it is going to tell on the price. The months of September and October of this year saw the best run of bacon hogs ever produced in Canada, because the price was good and the farmers sold when they were ready. When the price goes down, the farmer hangs on to his hogs and the result is the hogs are too fat. We had a cable recently from London saying that our hogs were too fat. Every one of our hogs last week averaged 190 pounds. The shrinkage was from 22 to 42 lbs. They were not fed by the drovers before they were shipped. You cannot dress a hog with only 18 lbs. shrinkage; it runs from 22 to 26 lbs. We have the people around Ingersoll educated so that they sell them when they are ready. The market in England is very erratic, but the farmer gets every dollar a hog is worth according to the English market.

Mr. DRYDEN: Is it not true that in an ordinary way the English market goes down at this season of the year, and also that the packers, knowing that, lower the price say a couple of months ahead? It is that fact that these gentlemen do not understand. I learn that the packers plan for the future. They know that the market will be certain to drop say in a couple of months and plan accordingly.

Mr. BARBER: There never has been a November on record when the prices have been as they have been this November. The reason was the shortage of hogs not only in this country but in Denmark.

Mr. ELLIOTT: I have been astonished to find that a good many farmers do not know the difference between the various breeds of hogs and their distinctive points. I did not come here to sell Tamworths, but to show you what we consider the ideal Tamworth. We have been led to understand that it is one of the best bacon hogs we have. The breed has been established in Canada for a number of years, and was I believe, introduced by the packers to quite an extent. The Tamworth is light in the head. All the head of a hog is good for is to give them enough sense to carry them around for six months and to masticate their food. The neck is short and light. The shoulder wants to be in such a shape that if you lay a straight edge along the side, it will touch all the way along. The shoulders should be tapering and nicely covered with flesh. If you have a hog that drops behind the shoulder, you will have a thin hog. The lower line should be straight without too much drop at the centre. If you get a light flank, you are apt to get a light cut below. Tamworths have not as good a ham as I should like to see.

Mr. GRISDALE: Formerly our experimental work at the Station was carried on with the view of finding out the most economical method of producing pork. Now, we have to consider also the quality of the product and the type of the animal. I heard a breeder say to-day that the breed and the feed made a bacon hog. That is true in some respects; in others it is not so. We can take the typical bacon hog, and so feed him as to spoil him, while we can take an inferior specimen and so feed him as to produce a medium quality of bacon hog. But it is not possible to conduct work along that line. It is much

easier to select some breed which already has the correct characteristics and feed along that line ; but I do not expect to deal with breeds. As to type, I have said all I intend to say.

The next point is as to economy of production. One point we have found essential is the keeping of the pig growing from the first to the day of its death. The pig that is stunted for a few days, or quits making progress, or loses flesh, is sure to result in an inferior quality of pork, and is at the same time more expensive. We have been conducting experiments with different feeds, and in some of them we are compelled to give foods when the pigs were young that were not conductive to growth. In every case we have found that they cost us much more.

As to the economy of feeding, it is hard to say exactly which foods are economical and which are not. We find that prices vary. If we take an estimated rate of so much a ton, or estimate the acreage at so much, we find that some years we get larger returns from an acre than others, and that in this way nature increases or decreases the cost of feed All these things therefore are relative to the market price. We have fed a great many pigs on pasture and a great many on rape. In every case our rape fed pigs have been very cheap indeed—the meat has been produced at a very small cost. In some experiments we were able to produce it at $2.70 per hundred while on rape. We put them on at three months old and fed them till finished, and they cost only $2 70 per hundred. When fed on rape alone they did not gain with sufficient rapidity, and we fed them a mixture of oats, peas, and barley—a small amount. It does not pay to let pigs come on too slowly, and we want them to come in early—as early as we can get them—before the fall in prices comes on. In November and December almost every year there is a drop. Therefore the pigs that are finished in September and October are the ones that make us the money.

Q. Is it not the supply that drops the market?

Mr. GRISDALE: No; not at all. The reason is, as I have been informed, that the market in December and January demands more poultry, etc., and as there is not the same demand for bacon, the market drops. To anticipate this drop, the packers are forced to drop the price here in November, because their November packed product comes on the market in December and January. We have also conducted experiments with clover. Clover fed pigs made great gains this year. Last year we had a few, but they did not succeed so well. One reason was clover was not so plentiful. This year we had a wet fall and the clover was fine, the pigs eating it with great relish. These pigs cost only 2½ cents a hundred, while on clover, which was for about three months. They came on rather slowly however.

Q. How do you value the clover in making this estimate?

Mr. GRISDALE: It was second growth, and we cut some along side of it, and took the tonnage of an equal area of hay, valued it at $5, and made a corresponding valuation of the area which we pastured. We have been working with the rape experiments for a year or two and find that we get excellent results. We find that rape and clover leaf are almost synonomous according to analysis. People look upon rape as inferior to clover, but it is equally valuable and the returns are very much greater. We got this year off one acre of rape, which we fed as a soiling crop 28½ tons first cutting and almost five tons the second cutting, or a total of about 33 tons per.

Q How long between the cuttings?

Mr. GRISDALE: The first cutting was in the latter part of July or early in August. We sowed the rape on 19th of May. The second cutting was later on,—in October and November.

Q. Do you ever feed your sows clover in the winter?

Mr. GRISDALE: Yes; we take the clover, put it into a barrel and turn the steam on it, and I never saw animals eat or drink anything so ravenously;—they seem to prefer it to milk. We took these clover pigs off when they weighed 155 to 165 pounds, put them in a pen and fed them grain—oats, peas, barley, and corn,—and when they reached an average of 180 lbs, we took them to the slaughter house, and every one was a good quality of pig. Another experiment we have been carrying on with pasture is with artichokes. This was suggested by a prominent breeder. This crop is very late in maturing, and we cannot turn the pigs in till late in September. They were in for about a month. During that time they gained about one and a third pounds per day, and cost us to feed—est-

imating the land at $5 per acre rent and throwing in the work—$1.80. We had no way of estimating the value of the artichokes. The hogs did the harvesting.

Q What did it cost to finish the pigs after they were taken off clover?

Mr. GRISDALE : Something over three dollars. The finishing period is the heaviest. As the artichoke fed pigs had not been slaughtered when I left home, I do not know the rerults. We also fed a number on a mixture of peas and oats, and vetches and oats. These pigs made good gains while upon them, but they were quite young and I have not particulars as to the cost. We have been trying experiments with roots. Prof. Day tells me he has been feeding roots also. Where we value the roots $2 per ton, as we have to do in our feeding work, (although we can produce them cheaper), we find that the costs of production is almost as great as when we feed grain alone ; but the animals are in a more healthy condition, and in some cases the meat seems sweeter. The meat from roots, clover and rape has a particularly pleasant flavor. If we are not satisfied with the report of the packer on our pigs, we take a small sample of the fat and have it analyzed. We find that while in some cases the packer is right in his estimate of the quality of the pork, in other cases he is wrong.

Q. How do you feed green oats and peas ?

Mr. GRISDALE : Just turn the pigs into it. It is not profitable, or at least it was not this year. The most economical crop was rape sown in rows. They never tramp it down, but walk up and down the rows and just eat it, and keep eating it for months without rooting it up. We have carried on a large number of experiments with milk—I refer to skim milk—and find it gives as good results as the roots when fed with grain. Our experiments with milk this year are ahead of those with roots. We are able to produce pork at 2¼ cents per hundred when on milk, at 2½ to 7 months old. It brought the pigs on very much more rapidly, and we got the highest market price in October. In every case we had a very superior quality of meat. Even where we fed corn, the milk seemed to counterbalance the injurious effects of the corn on the quality, and gave us a superior article.

Q Why is it we have so many soft hogs at the end of March and in April of each year ? Is it not because of too much roots being fed ?

Mr. GRISDALE : I am inclined to think that feeding hogs right up to the time of slaughter on roots or on pasture has a tendency to produce soft meat.

Q. Is it not also the want of exercise ?

Mr. GRISDALE : In some measure ; but that is not always the case. We had some pigs fed upon peas confined in a very small space indeed. They got nothing but whole peas and water, and produced the finest pork we ever had Whenever we keep a lot of hogs on one class of feed, there is very slow progress. A hog will thrive only when he has variety. That is a point all our experiments have brought out. Another point is that a small quantity of milk produced a good quality of meat more economically than a large quantity. We gave three pounds a day to each pig, and we found that the milk was worth forty cents a hundred. But when we fed a large amount of milk, the ratio decreased. The small amount had the same effect on the quality of the meat as the large amount. We fed cold skim milk in every case.

Q. What kind of food ration gives the best results ?

Mr. GRISDALE : Feeding the animal on cooked food while it is young ; then on pasture with some shorts and peas ; then increasing the pasture and the grain ration ; then at the last, taking off pasture and finishing off on some grain.

Q. What breeds did you have ?

Mr. GRISDALE : Pure Tamworths and Yorkshires, and crosses.

Q. How many months did you take to make your best pork ?

Mr. GRISDALE : The best pork this year took almost seven months. Pork produced in a shorter time was produced on corn meal and milk, and while of a very good quality, it was a little on the thick side. We find we must give time to grow if we want the best stamp of pig. Forced feeding with certain feeds has a tendency to make the bacon soft,—such as corn or corn and barley. But where an animal is forced with such food as I have described—cooked when the pig is young—and kept on with grains and grasses, and natural flesh-forming material, the meat is superior in every case.

Q It has been said that where two pigs have been kept together on the same food and in the same pen, one has been of good quality while the other is soft ; why is that ?

Mr GRISDALE: First, thrift; second, possibly some slightly diseased condition. For some reason the pig was not so thrifty when killed. An animal that is going back in any way, will produce soft meat. Another reason for soft meat is that farmers hold their pigs over, and having to keep them at the right weight, feed them less, and thus let them go back. These animals are almost certain to be soft. An animal that is not in a thrifty growing condition when he goes to the slaughter house will almost certainly turn out soft.

Mr. DRYDEN: An animal must be kept healthy from the beginning to the end; that is it. Not rushing and piling on feed, but in a healthy thrifty condition, making a uniform gain right through.

Q. What about potatoes?

Mr. GRISDALE: We find that they give very good results where you exercise the same care as in feeding pigs on roots and pasture. Potatoes have a fattening tendency, however. They will give good meet, but you have to slacken off at the last if you want good quality.

Mr. BRETHOUR: I concur with Mr. Grisdale as to soft pork—that is, the cause of it is owing entirely to the health of the animal. We had an illustration of that in the killing test at this show last year. We had a pig here that had never been a thrifty animal, and he came through as a soft carcass. We had another instance at Chicago the other day. We had a pig that we were trying to hold back for this show, and took it to Chicago with another. We thought it better to kill it, however, and the result was that when it was killed, it turned out a soft, undesirable carcass, while the other that was properly fed, turned out excellently. I also think that what ever character you form in the young pig, you will get the same tendency all the way through. If you force a young pig on fattening food, that animal will either die soft or excessively fat. You want to get in the habit of growing lean, thrifty and vigorous pork. In that way there is little danger of getting him too fat after three or four months of age. Young animals are often forced too much and over fed.

I have had very successful results with artichokes and can endorse what Mr. Grisdale says. I believe they give the best results if planted in the fall.

Q. What time in the fall?

Mr. BRETHOUR: At the end of the fall plowing,—just as you would plant potatoes. The pigs can root them out in the spring when there is no other green food for them. They give from eleven to twelve hundred bushels per acre.

Q. Why do so many more hogs cripple some seasons than others?

Mr. BRETHOUR: Why do we get so much soft pork in April and May? The reason is that these animals have been kept through the winter in an unhealthy condition. The season you get the most crippled pigs are after a severe winter, when they have not had sufficient exercise. After a hard winter with a good deal of snow, we get most soft pork for the same reason.

Mr. GRISDALE: Our finding is against corn in the matter of producing soft pork. The more corn, the poorer the quality of the meat.

LECTURE ON SWINE CARCASSES.

By Mr. J. W. FLAVELLE, of the Wm. DAVIES Co., TORONTO.

I want to talk of the bacon industry as a whole. Canada, rightly or wrongly, has tied itself to what we call the Wiltshire side,—that is a side where we cure the shoulder, the ham, and the middle together, and ship it as one side.

We have chosen this because thereby we compete with a higher class of bacon than is made from the corn fed hog of our friends to the south.

The Wiltshire side is not a speculative article; it is never carried. When it is due to come out of the salt it comes out, no matter whether the market is favorable or otherwise. It goes forward to the British market and is sold when it arrives; it will not carry. Some of you raise small fruits and send them to the market. You cannot carry them. You may know that the market will be a lot better three or four days from now, but your berries must be sold when they reach the market at the current market price.

The Wiltshire side is marketed in the same way. We are often confronted with a severe dip in prices, and then the community say there must be some putting together of the heads of the packers for the purpose of depressing prices But it arises from the knowledge of the packer, who, looking six weeks ahead, knows that it will be necessary for him to sell his supply at a lower figure, and therefore he puts the price down. You must recognize that along with the benefits of the market for this class of bacon, you have also the defects attending on it. Any packer who is foolish enough to hold over a bad market, not only does a foolish thing for himself, but harm to the whole community, because he markets a stale and off article, which injures the good name of Canadian bacon ; and the farmer who, through a time of dulness, holds his hogs till they are no longer fit for the best bacon, is doing the same thing.

This market is peculiarly governed by general conditions surrounding itself. You will often have Wiltshire bacon selling at twenty shillings a hundred higher than American cuts, or you may have to sell it at five shillings a hundred less, because it goes into an entirely different market The man who has a Wiltshire side to sell, sells it irrespective of what may be the basis of prices in various parts of the country for other cuts.

The home of the Wiltshire side is the city of London It has grown from London to the west of England counties, and the south of England, and only in a modest way in the north of England. In Liverpool they want the side cut up in an entirely different way. They want the shoulder and ham taken off. They want the middle, but the Londoner wants the whole side, and it pays the Canadian farmer and curer to give them that class of side.

There is a demand in England for all sizes of Wiltshire sides. We are constantly reminding farmers that the class of pig wanted should not run less than 160 pounds or more than 200 or 220 pounds. London wants a long and a heavy side It will do with sides running from 48 to 70 pounds, but it will not buy lighter ones. But the tendency of the trade is to ask for that for which they have the largest market, namely, a side that will range in weight from 48 to 60 pounds. There is always a market for a modest amount of heavy and light sides, but when there is a surplus of these lines, a heavy drop is sure to take place. For instance, every week every bacon curer in Canada has a certain sized market for so many fat sides. When he gets an overplus, it is no unusual thing for the difference between prime lean sides and fat sides to amount to twelve shillings per hundred. An overplus of anything that is not sizeable makes trouble. The tendency just now is towards too many fat hogs, and, in consequence, the market for over-fat bacon becomes congested. Some curers have a very valuable trade in South Wales. I think that is the case with our friends in Collingwood. There the trade runs to light sides. So in the South of England ; and a modest number of light sides can be sold at the price of the best. What the packer wants is a steady run of hogs of about even quality, with the average amount of heavy and light and a modest amount of fat, and the majority sizeable,—from 48 to 60 pounds. The packer cannot hold the less desirable sides till he thinks there will be less of them. He must sell the bacon when it is ready, take his punishment, and make the farmer pay for it at this end.

I should like to say to the breeders and curers here : There is only one rule you can apply to this Wiltshire bacon business—there is no curer or body of curers who can give you a reasonable idea of what prices will be six months ahead. He can tell you that, taking twelve months together. you will get a fair average return for your investment. But you will get $7 hogs and $3.75 hogs, and you ought to market the one with as good a grace as the other You cannot go into the business for six months in the year and then go out of it for six months without having a general average of prices ultimately that will neither be good for you nor for us If we drop a customer when we once obtain him, he does not like it, and we can only buy him back again by cutting prices. For this the farmer pays in the long run. We must have a regular supply. Every one entering on this business is under obligation to stay with it through both good and evil days. If you wish to develop the business to its highest point, you will have to live with your bad days and take your medicine decently, as well as with your good days, and get a fair average throughout. That is a part of the trade and you cannot get away from it.

During the months of March, April, June, and July, we have from 10 to 30 per cent. of our bacon soft, and in consequence we frequently have to limit the supply to our Old Country customers, while in the fall months you double the supply of hogs when the

trade is at its worst. A special effort should be made to keep up the supply in June and July.

Every year in the Wiltshire side business you will find certain times when you will have bad prices. But you increase the difficulty by increasing the number of hogs at the time of the year when there is the least demand and the greatest difficulty in placing the stuff on the market.

Now, as to what ought to be the relationship between the curer and the producer. What I wish to impress upon you is that prices are the result of conditions in the Old Country, and not because of any agreement between buyers here. Our house kills as many hogs as any in the country. We set our prices by the cables we receive from England, assisted by tables of averages which we have gathered up as the result of years of experience. But we have never, for a period of eight years, communicated with any packer as to what ought to be the price of hogs. Fluctuations are not caused by the packers putting their heads together for the purpose of putting prices down. There is no understanding between the curers whereby they agree to put down the price of hogs and get the profit for themselves.

This business has a common interest to us all. I like criticism. I think it is healthy to have competition. I think that the large number of new curing houses will be a gain in that respect. Let us not make the mistake in this important industry of imputing bad motives to one another, and endeavor to attribute the fluctuations in value to anything other than the natural conditions attending the trade.

Mr. SIMPSON RENNIE: How do you account for the fact that prices are lower in December and January than at other seasons.

Mr. FLAVELLE: Because turkeys, geese and ducks, as well as fancy beef and mutton, are then pouring from all parts of the world into the English market. This is especially the case with the Christmas trade. Just before I left home, I had a cable announcing a probable reduction of four shillings per hundredweight in the price of bacon owing to this cause. Still the sides that we have ready must go forward in spite of this announcement.

Mr. RENNIE: Then we should endeavor to have our pigs come in at such a time as will prevent the crowding of the market at this particular season of the year.

Mr. B. F. RUSTIN: How are you to arrange to have litters come at other than the natural periods?

Mr. DRYDEN: What do you mean by the natural periods?

Mr. RUSTIN: You cannot produce as many pigs in January as you can in the warmer weather. The mother will get chilled and lie on or destroy the litter. There is another point: I have this year actually got a premium of 25c. on my hogs that were over-weight.

Mr. FLAVELLE: You must not let isolated cases mislead you. As a general rule fat hogs go from 25c. to 50c. or 75c. to $1 per cwt. below prime weights, according to the market outlook. Something depends on the keenness of the competition as well. Just now I think there should be a difference between heavies and primes of 75c., while as a matter of fact, the difference is only 25c. But there are times just before navigation closes on the Great Lakes when we have orders for heavy weights for the lumber camps. Then over weight hogs are really worth more than prime hogs. At such times we should be glad to give a premium but for demoralizing the market. It may be that, in the case to which Mr. Rustin refers, some houses having an order of this kind have put up prices on heavy weights in order to bring in supplies. It is not unusual to find a difference of twelve shillings per long hundredweight between the prime and stout sides, in favor of the former. This is when we are getting about ten per cent. of fat hogs. Just now about 40 per cent. of the hogs are overdone, and the inevitable result will be a drop in heavy bacon of from eight to twelve shillings per hundred.

Q. Do you come into direct contact with the man who buys from the farmer?

Mr. FLAVELLE: Yes.

Q. Do you believe that on the whole the drovers are able to discriminate with any degree of certainty?

Mr. FLAVELLE: I believe that, from the punishment they get from time to time, there is no one in the community who knows a bacon pig better than they do. I have the impression that there are no better hogs marketed in the world than in this Province. While I have said what I have, the fact remains that notably during the months of September and October this year, there were no such hogs marketed anywhere as in

Ontario. You may find fault in individual cases, but I fancy the whole trade never produced better stuff.

Mr. GLENDINNING: The question is entirely one of education. In our section the buyers pay for what they get, and have not the least compunction in telling the farmer they will pay him 25c to 50c per hundred less for one class of hog than another, and we hear very little complaint now.

Mr. DRYDEN: If you do not make a difference in price, it is impossible to educate the farmers. The buyers are the educators. We had the same trouble with the butter, but that product has been improved, and we are going to do the same with the bacon. We will keep on hammering at it till we do; but we must have a discriminating market.

Mr. WILSON, of the Ingersoll Packing Co.: We pay a salary to our buyers, who then buy according to grade. By this means the farmer is induced to sell when his hogs are ready, because he knows that if he holds them for a higher price, he will lose in the grading owing to the hogs being over fat. I think there are too many drovers in the country. There are two or three times as many as there is business for.

Mr. BRETHOUR, of Burford, was then called upon to speak regarding the bacon carcasses that were presented to the audience. He said: I do not wish to be misunderstood in anything I may say in making comparisons. I am not making comparisons of breeds, but of individuals. The first carcass is a cross-bred one. He is of the correct form. You find a gradual tapering to the ham both ways and a long side. Following the carcass around the side, you notice that the flesh is well covered on the underside and distributed evenly around the bone. The thigh is covered all round with muscle which means lean and tender meat—what the market demands. If you get a carcass with a full, round ham, you usually get a large proportion of excessive fat on the outside. This necessitates trimming off and consequent loss to the packer. It is necessary for the flank and loin to be sizeable with an equal distance from the loin to the flank; then the flesh on the inside will be distributed evenly with fat and lean and of good thickness. If you have a cut up flank, you get an uneven carcass. The side should be long. That is the cut in demand in the Liverpool market. The whole side should be long for any class of English trade. The shoulder should be smooth and regular. Have no prominence on the shoulder. The shoulder of the living animal should be flattish. The neck should not be long, but fairly lean and muscular. It is not necessary to discuss the head in this connection. If the skin inside the carcass is loose and flabby as in this case, it shows that the animal was not disposed of at the time it was in prime condition. Otherwise the carcass is good.

In the next case we have an unfinished carcass. It has been underfed. It is large enough, but has been kept too long and is dry and harsh. The lean meat is hard and muscular and undesirable . . It is probably an old carcass that has been fed slowly and never received enough nourishing food

In the next illustration, you will notice by its form that it has not the length. It has plenty of thickness—in fact too much, both in front and along the back. The sides are short and it is heavy in the shoulder. The head is fairly good—not much jowl; but I do not think it is long enough to cut a desirable Wiltshire side. It is too thick on the back. If it is too thick, it makes no difference about the length.

The next illustration is the finest carcass in the building. The general form and character is all good, and it is in prime condition, showing that it has been properly fed from the time of birth to the time of slaughter.

Mr. HODSON: Very frequently we see pigs that are good from the shoulder back, but which have a thick shoulder and thick arched neck; packers call it a crown. As I understand it, they always cut No. 2 sides.

Mr. FLAVELLE: Very often we get a hog with a heavy shoulder which is otherwise a desirable model. This causes it to be graded No. 2. The object should be to breed a hog with an even depth of fat all the way down the back, so that if it is a little too well fed it will still show an even depth and class as No. 1. A hog with a crown will be sure to show too much fat at that point if it has been at all over-fed.

Mr. BRETHOUR: That can be bred out entirely by careful selection. An animal must first have the correct form; but of course you must feed it properly as well. As to feeding, many maintain that it costs more to feed a long hog than it does to feed the thicker and shorter animal. I think it has been clearly borne out by experiment that as

cheap pork can be produced with the bacon hog as with the other type for the same amount of feed.

Q. What about the time?

Mr. BRETHOUR: There is a good deal of difference as to the length of time required to produce a prime carcass. I think it depends largely on the individual animal. If an animal is naturally inclined to be thick and fat, it must be held back and not fed so well; while an animal of the correct type may be liberally fed throughout. This animal was fed on barley meal, and was not allowed exercise, being confined to the pen. Latterly, it was fed sweet corn in the ear. We thought at one time that we had to let this class of animal get eight or nine months old to make a prime bacon carcass, but I do not think it is necessary if you have the correct form, and an animal predisposed to produce lean meat. That I think is one of the conditions that are necessary. You might take a Jersey and a Holstein, feed them the same feed, and get a different product from each. It is the same with hogs. Certain animals are predisposed to produce lean meat, and others to produce fat. Animals fed in the corn belt are a thicker and coarser made pig, because it has the faculty of converting corn into pork. I do not think that a long pig, fed judiciously, will cost more than one of the short variety, fed on the same kind of feed; and I think the farmer will find it cheaper to feed a mixed ration than a one sided ration, such as corn. Americans feed largely on corn, as they can get it cheaply and produce cheap pork which sells in the English market at a lower price. Have a regular system of liberal feeding from birth to the time of slaughter. But you must have a healthy animal. If you force an animal at any one period, it is going to be in a congested condition. I strongly advocate a large amount of vegetable food with a moderate amount of grain of any kind; although corn should not be fed till an animal is three or four months old. Animals are frequently spoiled before that age—they get into the habit of producing fat.

Q. Have you had experience with corn?

Mr. BRETHOUR: Yes; experience and observation combined.

Q Corn is getting to be a more important grain with us every year. I am persuaded that corn in moderate quantities, and with dairy products, can be safely fed.

Q When was that pig weaned, and what was it fed till three months of age?

Mr. BRETHOUR: This animal was one of a litter of eleven and was weaned at two months. They were strong and vigorous, but not fat. They were then fed on barley meal. The animals were fed three times a day till about five months old, and then fed corn twice a day with some vegetable feed in the middle of the day. Younger animals want to be fed more frequently. With regard to corn, I think there is a wrong impression regarding it I think it is useful and that you can get good quality with judicious feeding. They should also have a lot of exercise. Last year ours ran in a field of artichokes, and towards the finishing period were given a little barley, peas and water mixed.

Q. Were the pigs fed with skim milk?

Mr. BRETHOUR: Yes, a little, but not a large quantity. I think it is one of the best things you can give.

Q. We should like to know what breeds of hogs or what crosses will produce the right pig for the bacon trade?

Mr. BRETHOUR: The show ring will show you that.

Q How is it that Mr. Rettie's pig took first place as a carcass, but come only third in the show ring?

Mr. HODSON: I think the reason was that the judges thought they would cut too thick. I went over the pigs and they had every appearance of it.

Mr. DRYDEN: Then there must be something in reference to the feeding. Will Mr. Rettie tell us how they were fed?

Mr. RETTIE: In the early part of the finishing period, they received a mixture of corn and shorts in equal proportions with whey added. Before that, after weaning at six weeks, we fed whey and shorts. For finishing, we fed a mixture of barley and wheat in equal proportions with whey added. I think that pair were set aside for being too thin, not too fat; there were two pairs.

Mr. BRETHOUR: These animals were all classed as No. 1. You must understand that these animals were all pretty near ideal. The difference between them was very slight. One animal may kill out a little better or a little worse than appearances indi-

cate. No man can tell how close the lean meat will come to the outside in the living hog, and the judges should not be blamed.

Q. What feed do you recommend in the fall when we have no skim milk to bring up young pigs.

Mr. BRETHOUR: Middlings and shorts, not large quantities of corn, and a little vegetable feed.

Q. Would you recommend cooking the food at that stage?

Mr. BRETHOUR: I think it should be warmed, but I do not think there is very much gained by cooking.

Mr. WILSON: I was not a judge of live hogs, but I helped to judge the carcases. I think the judges did remarkably well. The first prize in Yorkshires came out after they were dressed just as they were judged alive. It is rather a difficult matter to tell exactly the condition of a hog when alive, although we can nearly do so. They may deceive on account of the nature of the food or how the hog has been treated. We did not give any prizes to the Duroc Jerseys, Poland Chinas and Chester Whites. We did not consider them bacon hogs. They were too fat, and not suitable for the trade. The breed has also something to do with soft bacon. We should like to see Improved Yorkshire and Tamworth sires used.

Q. From what breed of grades do you get the best animals?

Mr. WILSON: From the Tamworth and improved Yorkshire cross. This is the best cross we know.

Mr. FLAVELLE: As to which breed should be used, I think depends largely on the prevailing tpye of hogs in the country. For instance, the tendency in the West has been towards a short thick hog, and the Yorkshire would in that case be preferable to the Tamworth. In other cases, the Tamworth sire would produce better results. I think if Mr. Wilson's house had taken up with the Yorkshires and our house with the Tamworths, instead of vice versa, the results would have been better in our respective sections. I think there is a tendency for the Tamworth to lose its identity with the hog with which it is crossed. There is a tendency with the York to assert his individuality, no matter on what you cross him.

Q. Then the Yorkshire is the stronger breed?

Mr. FLAVELLE: I do not know as to that.

Q. The proof of that is seen in the first prize bacon carcass. That is the product of a three quarter York sow and a Tamworth sire; still it looks more like a Yorkshire than a Tamworth.

Mr. SIMPSON RENNIE: The ordinary prize list in connection with hogs is all wrong. Prizes are offered for Poland Chinas and other hogs, not over 20 per cent. of which will make bacon fit for the English market. These township fairs should not be allowed to use public money in giving prizes for hogs which do not produce the sort of bacon that is wanted for the English trade.

Mr. WILSON: I believe this show will prove a great educator, as it will give the people a better idea of what the market calls for. These is plenty of room yet for instruction of this kind. I have received a telegram since I came here telling me that of the 2,000 hogs killed at our factory yesterday, 50 per cent. were over fat. The English market will take all kinds of products, but there is always a lower price for products that are not of the right quality. If it was not for the English taking our fat as well as our lean, every packing house in the country would have to close up, because of our entire output, 87 per cent. goes to the English market. We consider the Yorkshire sow and the Tamworth sire the best cross. In our case we got a preponderance of Tamworths because years ago we distributed fifty Tamworth sires among the farmers in our neighborhood.

Mr. GRISDALE: As to cooked *vs* raw food and its effect on the quality of the meat, we have tried a good many experiments at the Ottawa Experimental Farm, and so far as cooking is concerned, it seems to have no effect. As to the influence of food on the quality of the meat,—with corn, we had a rather inferior quality of meat. Also, the more corn, the softer the meat. This was modified when milk was fed with the corn—that is skim milk or whey. This year we fed a lot of pigs on corn and skim milk—three pounds of the latter per day. Four were good sides and two were soft, so that it was a medium feed. Where we fed milk along with oats, peas and barley, or any one of them,

we had good results every time. We find that skim milk and whey give good results in almost every case. Most men talk a good deal about the necessity for exercising pigs. We find that whether they are in a large or small pen, the feed seems to have the same effect. The run did not seem to effect them at all. The results were equally good.

Mr. DUNCAN ANDERSON: Don't you think that pigs with a run would be a little longer?

Mr. GRISDALE: We did not find it to be the case.

Mr. ANDERSON: That has been our experience.

Mr. DRYDEN: Are you in favor of a short run?

Mr. GRISDALE: Yes; so far as economy of feeding is concerned, but not as regards quality.

Mr. ANDERSON: I think it is important for summer feeding to give them plenty of run on a clover field.

Mr. GRISDALE: Where you have a lot inside, the ones that are not perfectly healthy do not succeed as well as the others, and I think they come up more evenly where they have a run.

Q. What about feeding roots?

Mr. GRISDALE: We find it is very beneficial to the health of the animals, but if we feed them heavily till the last, it has a tendency to produce soft meat. It is desirable to take them off for two or three weeks before killing. That is the reason for so many soft hogs in the spring. The farmers forget to take them off the roots a few weeks before they are slaughtered. A pig fed in winter has a harder time making growth than in the summer, because it has to contend with the cold. Feeding him warm food makes him more thrifty. If this is done, and he is fed a moderate ration of roots, he is likely to be almost as thrifty as in summer, and we are certain to get a superior article. We feed roots raw except potatoes. Potatoes are better fed cooked, but if fed in large quantities they will likely make soft bacon.

Q. What proportion of potatoes would you give them?

Mr. GRISDALE: I would feed them all the shorts they want and then throw the potatoes in to them.

A resolution was passed thanking the representatives of the packing houses for their presence, and the meeting adjourned.

LECTURE ON JUDGING SHEEP.

By JAMES TOLTON, WALKERTON.

We have two sheep before us supposed to be pure-bred and representative of the different breeds to which they belong, one an Oxford Down, and the other a Shropshire. The Shropshire may be considered a typical sheep of that breed. There might be some objections found to him. I think that he is a little too dark in the ear and face, and not as well covered over the head as he should be. He has the size and character so far as the build is concerned, and is a blocky lamb. He is well developed in the parts where the best mutton cuts are, which bring the highest price in the market.

The first thing that strikes the judge is the general appearance of a sheep, Appearances go a great way. A sheep is different from a hog—there is the wool to be taken into consideration. Sheep are judged from two standpoints, first, from the breeding standpoint, and second, from the mutton standpoint. Just what will fill the bill in one case may not in the other. The first thing I look at in judging a sheep is whether he is developed in the hind quarters, which is the most valuable part of the carcass. Then I look to see whether he is too long in the legs. This sheep might be a little lower, but is only a lamb and has lots of room to grow both up and down. A very important feature is the loin. You want a well developed loin. The animal should be well ribbed up with good development just behind the fore legs. If he is not, he will not have a good constitution, which means everything. If you have not the constitution you never can make anything out of the sheep. You do not want a sheep too long in the neck, either for

breeding or meat purposes. He should have a shortish neck, and a shoulder of medium breadth—not a sharp pointed shoulder, nor a backbone sticking up like a ridge over the back. You want the legs standing wide and square under him.

As to the Oxford sheep: you want to guard against a fleece of this character. You can see by the head and eye of this sheep that he is not thriving. The fleece has an open or staring appearance—but this about the fleece might not apply to sheep of all breeds. In judging pure-bred sheep, we want an animal that follows the type and character of that breed. All breeders know what these types are. This sheep is too bare on the top of the head and too light in the color of the ear. He is too long in the neck, stands too high above the ground, and is not well filled out between the legs. I do not regard him as a favourable specimen of the breed by any means.

Mr. DRYDEN: What is the value of the head covering? It is really a fancy point, is it not?

Mr. TOLTON: Yes; merely a fancy point; it is important to the breeder but not to the consumer. The type of Oxford has changed somewhat in the last fifteen years. We want to breed them so that they do not stand so high from the ground. That has been a failing in the past. As to the wool, the fleece should be even—not coarse, hairy wool on the thigh and fine elsewhere. We require it uniform and of the same fibre all over. We should have a heavy, dense fleece with a long and a strong fibre.

Q. How would these two sheep suit the consumer?

Mr. TOLTON: The Shropshire would suit all right, but the Oxford would not.

Mr. GRISDALE: I did not hear the whole of Mr. Tolton's address, but he made a few points that I hardly understood; one was judging from the breeders' standpoint and judging from the butchers' standpoint. We are making too much difference there I fear. If we are to judge from the animal the butcher takes after it is slaughtered and the animal to which the judges award the prize in the ring, there is something wrong in the slaughter test they have been conducting here and in England and elsewhere. We find that the animal which is so heavily coated with fat and considered a first prize animal in the ring, is not the one that brings the best price from the butcher, because it will not sell to the consumer, and for that reason I think we are too frequently awarding the prize where it should not go, and this is, I think, the point where we must first reform. Still some points are very essential, such as the characteristics of the breed, the type of the head, etc. They are essential as distinguishing the breeds, and have the tendency of keeping the breeds pure.

In judging a sheep, we must go over it carefully so as not to miss any of the essential points. Begin at the head and examine the face. Notice if the characteristics are right. A long neck is a disadvantage; if you find a short neck the rest of the animal is usually well formed. Then note the covering along the back especially at the loin. Then come forward again and note the depth, constitution, and lung power. Going back again, we get the depth and covering on the ribs and down to the quarter. The twist is important in examining for leg of mutton. In this way the whole of the animal is taken in. If you skip from one part to another you are likely to forget some essential point.

From the examination of the head, we are able to judge a good deal as to the disposition and the liklihood of an animal being successful as a breeder and feeder.

Q. Do you consider that this Shropshire specimen has sufficient bone?

Mr. GRISDALE: Yes; fair bone.

Q. What color ought the skin to be?

Mr. GRISDALE: Bright pink. You cannot always tell from examining the skin whether it is right or not. It depends on which way the light falls, and the animal's health will influence it materially. The pink skin denotes that an animal is well bred, and has no tendency to dark hair; but that is not always true.

Q. Has that lamb a good constitution?

Mr. GRISDALE: I should like it with a little more. More depth and breadth between the front legs, and a slightly greater girth would show more.

Q. Does the shortness of leg indicate a good constitution.

Mr. GRISDALE: I do not know that it does, but usually a short neck goes with a good constitution.

Q. Do you think that the more the fancy points multiply the greater the chance is of letting other points deteriorate?

Mr. DRYDEN: There is a danger, and that is what the breeder has to guard against. We must not lose the constitution or strength and character of the animal, but we ought to give the consumer what he wants—that is, what sells best in the market. The attempt seems to be to separate the butcher from the breeder and the feeder. There is no real separation. The aim of all should be for the block.

LECTURE ON THE DAIRY COW.

BY PROFESSOR H. H. DEAN, O. A. C., GUELPH.

Men and women the world over look for signs. If they have a dream at night they look it up in the dream book the next morning to see what it means. People might say that the dairyman must be stupid, or he would know by this time all about the signs of a good dairy cow. The dairy cow has been talked of for the last fifty years by everyone who knew anything about a cow, and by lots who knew nothing about it at all. Yet the shrewdest men are unable to locate exactly the signs of a good cow. Why is this? The milk the cow gives, as someone has said, is the life fluid; I will go further and say that it is life. It is so closely associated with life that the secretion, or the making of milk, is as mysterious as life itself We have never been able to understand thoroughly the science of the making of milk. The first man who attempted to reduce the signs of a dairy cow to a science was a Frenchman about the middle of the century. He was a fruit-grower when he first began to study the question, as was his father. He noticed that his father was very particular in selecting buds and grafts, and the thought suggested itself to his mind, why could not the same principles be applied in the selection of a cow. He thought the same principles of selection could be applied, and that it would be possible to discover signs which would indicate clearly what the capacity of a cow should be. He tells us, "If you select cows according to my method, I can guarantee that that cow will give so much milk for a certain length of time and of a certain quality." No doubt you will all have read his book and have wondered at the,—I might almost say,—nerve, of this statement; and yet he was the forerunner of those who have attempted to reduce the signs of a dairy cow to a science. He built his whole theory on the "escutcheon" or "milk mirror." He put the matter forward in such a plausible way that the American Dutch Friesian Association, in the first volume of their herd book, endorsed his theory, and said: "If you will buy cows of this breed, and study the escutcheon theory, you will find in many cases where the escutcheon calls for ten or twelve quarts per day, the cows will give more than that." Their first volume was issued only twenty years ago; and thus we find an association of practical men endorsing the theory. But practical men who studied the system soon found out that he had not reduced his system to an exact science, and that there were very many discrepancies in the selection of cows by the escutcheon.

After that came the "triple wedge" theory. Speaking for myself, I have never been able to see where this triple wedge came in in a dairy cow. We have had very recently what has been called the "cat ham" theory, and various other theories; but after all, let me tell you, after ten years' careful study in the selection of dairy cows, I feel quite free to say that there is no man living who can tell exactly what the cow will be by her appearance. Once, when addressing a Farmers' Institute meeting at Tamworth, I met a man who said he could tell by the notches in the backbone and the length of the cow's tail what she could do as a milk producer. I said, "If you will come up to our dairy at Guelph, go over our herd and tell what each animal is capable of, I will pay your expenses." About two months after, he came in, and put his theory into application, but he was miles from the mark, and he has not asked for his expenses yet.

Still, there are some points that I always look for in a cow. I look for three chief characteristics, and base my expectations on them. We look first for the indications for the production and quality of the milk; next for constitution, and next for points of beauty. What are the indications of milk-producing capacity in a cow? The horseman gives his ideas of a good horse as "no feet, no horse." I sum up the qualifications of a dairy cow by saying, "no udder, no cow." I look first for an udder that comes well forward and well up behind—that is greatly developed in the fore and hind quarters. I

like the teats of good size and squarely placed. They should be covered with fine, silky hair and skin. I like an udder that shows the milk veins prominently, and has the milk veins well developed. I would also look to some extent to the escutcheon. It is perhaps one of the indications of the cow's capacity to produce milk. A large escutcheon indicates a large quantity of blood going to the cow's udder. Milk is made from the blood, and the milk veins, so called, merely indicate the amount of blood that passes from the udder to the heart and lungs. A large escutcheon is generally considered as indicating the flow of a large quantity of blood to the udder, and this should be some indication of the quantity of milk a cow will furnish.

These are some of the main indications of the ability of a cow to produce milk.

As I stated, the milk is made from the blood. How is the blood made? It is made from the food that the cow takes into her body. Therefore we must have a cow with a well developed "bread basket." How is the food manufactured into blood? By the application of nervous force or energy. What are the indications of that in an animal? A bright, prominent eye. The eye indicates to the dairymen the amount of nervous force generated. Look too for a well developed spinal cord, which is the trolley wire along which the nervous energy is transmitted.

We must look for indications of constitution in the fore part of an animal where are situated the vital organs. A cow well developed in this particular region indicates plenty of constitution and vitality. Easy, regular breathing indicates the same thing, and so do the skin and the hair. It is a well known fact that the hair is most quickly affected by any derangement of the constitution. That is probably the reason of so many bald heads—they show that a man has not sufficient vitality to nourish the hair properly. It is the part farthest away from the vital organs, and the circulation is not strong enough to send the blood to it.

What are the indications of beauty? Beauty does not belong to the male sex. A dairy cow to some men might possess beauty of form. Many men keep cows largely for the pleasure they get out of looking at them. We may not agree as to what beauty consists of. To my mind it means, first, the right combination of color. Colors strike us more quickly than anything else I know. The next point is the right relation of the various parts to each other. If a cow has a coarse, ugly head, no matter how beautiful her body may be, she cannot be called beautiful. Some cows are somewhat sluggish in their movements, not having that grace and ease we should look for. This is the third point of beauty. We may conclude, therefore, that the ideal cow combines production of milk with grace of form; but the perfect cow has never yet been produced, and I doubt whether she ever will be produced.

G. W. Clemons: In my experience, the notches in the back are the best sign in a dairy cow. Deep serrations in the back indicate milk giving qualities. I do not altogether agree with the theory of "no udder no cow." I knew a cow that had an udder which would deceive almost anyone; she produced 83 lbs. of milk per day.

Mr. Dryden: But that cow had an udder.

Mr. Clemons: I have seen remarkably good cows without good escutcheons. I am an advocate of the three-wedge principle. That is my ideal of the dairy cow. I never found a good Ayrshire cow without sharp shoulders.

Q. Is there anything to indicate the richness of the milk?

Mr. Clemons: The form has not much to do with it. It has to be bred in the cow. In my experience you cannot feed a cow to give rich milk—not a cow that has been kept to fairly good advantage. Rich foods will affect the quality for the first three days or so, by setting up a slightly fevered condition in an animal, which appears to increase the richness of the milk by decreasing the quantity; but after a time they have no effect. Where cows have been poorly fed for a number of years, and are then well fed, they may show some improvement, but a cow that has had average food all her life cannot have her milk enriched by any system of feeding. We have fed as much as two pounds of tallow per day in order to increase the richness of the milk. For a few days this had a good effect, but, after that, you might as well have fed so much grease. I do not think the color of the skin is any indication of the richness of the milk.

Prof. Dean: A great many people have the idea that the color of the skin on the udder and escutcheon is an indication of the richness of the milk. All it indicates is its color.

Q. There is an impression among milk consumers that the color of milk indicates its richness, and they will pay more for yellow than for white milk, is this correct?

Prof. DEAN: The color is something entirely different from the richness, although very often we find that yellow milk and rick milk go together.

Mr. DRUMMOND: I quite agree with what has been said as to color and richness and color of skin. A slight rise in the backbone is always found in a good cow. The points laid down by the Breeders' Association ask for a straight back. That should be changed. A deep cavity nearly always goes with a good milker.

Prof. DEAN: What about a deep flank? Nearly all the breeders of dairy cattle call a deep flank?

Mr. DRUMMOND: We never got a cow with a deep flank that was a good milker. It has got to be an arched flank, well cut away, or you have no room for the udder. The straight line in the back is all right for beef animals but not for dairy animals. The Jersey breeders have changed that in their scale of points.

Mr. DRYDEN: I am glad to hear that one has moved in the right direction. The others will no doubt follow.

Mr. DRUMMOND: We all like to see the escutcheon well formed and of good color, but we do not all put a great deal of weight on it. The dairy cow is the direct opposite of the beef animal. In the latter you want the meat carried well down on the flank, while in the dairy cow you want the "cat ham." We like particularly to see a good sized muzzle. Small nostrils and a narrow muzzle indicates a delicate constitution. Such animals cannot use enough feed and will not wear long. The question of fine shoulders is very much debated. We are inclined to ask for fulness where the lungs are. Have good width back of the shoulders at the bottom part of the lungs. I like the backbone to come a little over the shoulder blade. I like, too, to have good width between the ribs. You rarely get a closely ribbed cow that is a large producer, because she has not room for her food. The neck should be fairly long and nicely connected with the head. It should be flat and muscular instead of being round. The dairy animal should have a flat neck, different from the beef breeds

Q. Does the color of the horn indicate anything?

Mr. DRUMMOND: I never pay any attention to the color of the horn in buying a cow. A cow will produce as much without any horn at all. It is only useful for protection, and by the way, no dairyman should have a dog round his place.

Q Does dehorning affect the usefulness of an animal?

Prof. DEAN: Practised for a number of generations on a male animal, it might affect the dairy qualities, but it has no effect so far as the cow herself is concerned. So far as experiments have gone the world over, the quality of the milk is affected very slightly by the feed. A cow constitutionally bred to give three per cent. milk cannot be fed in any way so as to give four or five per cent. fat in the milk. The same cow if fed on turnips and straw will probably give a little richer milk than if fed upon clover hay and all the best feed you can give her.

Mr. MCMILLAN: What has been impressed upon the Jersey cow to give rich milk beyond all other breeds? Is it not because she has been bred in the Jersey Islands where the grass is exceedingly rich? While you cannot increase the quality of the milk in a short time, you will do so in a number of years It is only by feeding rich food continually for a large number of years than it can be done.

Prof. DEAN: That seems to be a reasonable thing, and I am sorry to say that the facts are against the theory. We have before us an example of a breed of cattle (Holstein) that has been produced in the finest dairy country in the world, where there is grass in abundance, and where the animals receive the best of care. Still we find that the cows coming from North Holland do not give rick milk. If the theory is correct, we should expect these cows, who have been handled by the best dairymen in the world—the finest feeders the world has ever seen—these animals should be giving rich milk, but as a breed they do not. It is not so much a question of food as a selection of the animals. I know that is a very hard pill to swallow.

Q. Is there no way to determine the quality of the milk except by Babcock test?

Prof. DEAN: No other simple way.

Q Why is the quality of the milk not as rich in summer as in winter?

Prof. DEAN: You have a larger number of fresh cows in summer time. The fresher the cows the richer will be the milk.

Q. Is a good butter cow always a good cheese cow?

Prof. DEAN: I should say, Yes; but a good butter cow may not always be the most profitable cheese cow. A good cheese cow may be a good butter cow, and I think she usually is; although I fear we are getting now into rather deep water.

LECTURE ON SHEEP CARCASSES.

By H. A. FOULDS, BRANTFORD.

I shall speak from the standpoint of the consumer and the block test. As a rule, the heavier the lamb the more money the farmer gets for it, but an exception must be made in the case of an animal where too much fat has been put on. We will not buy an overfed sheep from the farmer if we can get one that we do not have to trim the excess of fat from and throw it away. It is just the same with an overfed sheep as with a hog that is too fat

Mr. DRYDEN: We want you to let the farmers know what kind of an animal he is to produce to suit the consumer.

Mr. Foulds: He must first get the right breed and then feed them right so as to get the most muscle with the least fat. Then we shall have what we are looking for. In the specimens we have before us, the third prize sheep will weigh, dressed, fifteen pounds more than the first prize. Still the third sheep, because it has been overdone, will sell for less than the first. It is far too fat. One of the best cuts in the sheep is that which makes chops. These are taken from the upper half of the back just behind the shoulders. Frequently so much fat is put on there that we have to trim off about one third before we sell it to the consumer. These trimmings are worth only two or three cents per pound, while the lamb, dressed, costs us eight or nine cents. You can see, then, how unprofitable an overfed animal is. When the fat and the lean are properly mixed in this part of the beast there is little trimming to do, and the profit is consequently much greater. It is true that the lean meat in a well fatted beast is decidedly better than in a thin animal, but so much trimming is necessary in the former case that the good meat is produced at a much greater cost, and the animal is not profitable either for the feeder or the butcher. A fairly fatted animal, one with the lean and fat well distributed, gives just as good a quality in the lean meat as one that is over fat.

Q. What is the best breed of animal from the butcher's standpoint

Mr. FOULDS: We are not here to advocate one breed or another. We find the best results from the Shropshire. Feed the Shropshire right, and you will have a good animal for the consumer.

Mr. JOHN CAMPBELL: I am the breeder of the third prize carcass, and it seems to me that there is something wrong in judging sheep alive and in the carcass. I showed that sheep alive in Chicago, and he won a high place with the best. He did the same thing at this Show, but in the carcass competition he has been awarded only third place. The fact is the sheep that will win alive has no show when it comes to the block. The one that runs in the field without any other feed than that which it can pick up, is the one that wins in the block test.

Mr. FOULDS: Sheep are certainly the better for having exercise. If they have plenty of exercise and a little grain to finish up, they will develop plenty of lean meat.

Dr. MILLS: It seems that one class of judges reach an entirely different conclusion from the others, and seem to be working from a different standpoint. If that was not a desirable sheep for the consumer, it should not have been awarded first place when alive, and one of the first things to be done is to correct the standards by which live animals are to be judged.

Mr. DRYDEN: In my judgment the form of this animal is all right, and the judges judged it from that point of view; they were not thinking of how fat it was.

Q It is the consumer who regulates the price in the end.

Mr. DRYDEN: You have never seen in Chicago, or any where else, that the animal which takes the prize in the ring afterwards takes the first prize on the block. If you

judge sheep and cattle like you do hogs, you will get that result; not otherwise. A hog is judged alive according to what kind of Wiltshire side it will make.

Mr. ARKELL. If the judges judged live sheep by the same standard as they judge carcasses, they would be hooted out of the ring.

President MILLS: That shows that public opinion on this matter requires to be changed. The prize should be awarded not for the fancy points of the breeder, but to the animal that will give the best results on the butcher's block.

Mr. DRYDEN: I should like to hear how these sheep have been treated.

Mr. LLOYD-JONES: (Breeder of the first prize carcass). We had a big field of rape and our sheep ran in it with an occasional change to blue grass pasture. Six weeks ago we started feeding a little grain—oats and peas mixed three times a day. For fear we should have them too fat, we reduced the grain almost entirely two weeks ago.

Mr. DRYDEN: You were giving them too much before?

Mr. LLOYD-JONES: All they could take.

Mr. CAMPBELL: I bought the third prize lamb about fourteen months ago. It was fed mixed grain during the winter—and in the spring it was put upon grass and rape. In the fall it was again fed on mixed grain.

Mr. DRYDEN: I have no doubt that Mr. Campbell's was a fat lamb and has been kept fat all the way through. He was no doubt in good condition for the butcher twelve months ago, and should have been sold last year.

Mr. TYSON: Yes, and if he had been fed a third year he would not have been worth any more than he is to-day. The reason we gave this animal the first prize is because he is a little thicker and not too fat. He has a better loin and is not as heavy in the bone as the second one. The first has more lean according to the fat. You want the meat on the leg and the loin, and down the back. The third prize carcass is not so full in the hips as the first, and the first is also thicker just in front of the hips. In the third prize animal you will observe the bunch of fat just in front of the tail. This often indicates that an animal is over fat all the way through.

Q Do you look upon the hind end as the most valuable part?

Mr. TYSON: Yes.

Q. Can you judge these dressed carcasses with any degree of certainty without cutting them?

Mr. TYSON: Probably not altogether. That is one of the reasons why live judging does not always correspond with dressed judging.

Q More lambs are sold than shearlings; is there any danger of making lambs too fat from forcing?

Mr. TYSON: You might do that.

Q It does not often occur with a lamb. I think I am safe in saying that for every lamb that is too heavy five are too light. Give a lamb any chance at all and he will get fat enough.

Mr. TYSON: They are very often too light.

Q The lamb trade is worth more to us than the shearling trade.

Mr. DONALDSON: For years judges have been judging from a wrong standpoint both in cattle and sheep. They have been giving the first prize for the fattest animal without regard to quality. Both should be taken into account. In this particular case we find that a third prize carcass comes from a sheep which alive was far better in form and shape than the first prize animal. There is more spring of rib, more breadth of body and a better conformation generally. If he had been properly finished he would undoubtedly have won the first prize in the dressed competition, but he was overfed in order to meet the standard of the judges of live animals.

Mr. TOLTON: He was an excellent sheep spoiled by overfeeding. He had a better constitution, a better form, and was better in every way than the other sheep. He had also a natural tendency to put on meat where it was wanted.

Prof. DAY: In judging at the Chicago Fat Stock Show, they did not cut the carcass at all. They told me they went largely on the external appearance—the way the fat was distributed. One man told me that in judging live sheep, all he wanted to do was to feel the rump. He said, if there is a large lump of fat above the tail, it was not necessary to go any further; that was sufficient to condemn it as being overfed. I think there is something in it. In the carcasses here, those that show a large development of

fat above the tail, show too much fat all over. The properly fed animal is pretty smooth over the rump, and the fat is carried smoothly over the whole carcass. At Chicago the animal with the fullest twist and the heaviest hind quarter was not looked at because the fulness often consisted of fat. That makes it difficult judging animals alive. By putting on a lot of fat in front of the tail, the breeder gives the sheep a better appearance in the show ring, when the animal is shown on the hoof; and it seems to me we are somewhat at variance in the matter of judging live and dead animals. I went to Chicago specially to see the dressed carcass competition. They wanted the carcass that was smoothest—smooth development all over. We should look to that in judging live animals. We should make an effort always to discount an animal that tends to put on big lumps of fat in any part of his carcass. You will see it in the beef carcasses as well as in those of the sheep.

Mr. DRYDEN: When I was at the Chicago show I watched the judges judging Shorthorns in the ring. They judged them not as Shorthorns, but as beef cattle. In one case they turned down an animal for the very reason Prof. Day has mentioned. I thought it was one of the best. They said: That animal will develop a roll of fat; we do not want that.

Prof. DAY: You could not see a lump on the sweepstakes steer at the Chicago show. He was as smooth as an apple all over.

Mr. SMITH: I had an opportunity to handle that steer, and he bore out the character you give him.

Prof. DAY: I asked one of Swift's men whether that steer would kill too fat. I thought he would, looking at him. I also asked him about the first prize car load of steers that sold at 15½ cents a pound. He said they were just right for their best trade. They were pretty fat, although not as fat as the sweepstakes, but they were smooth and not over done. I think we shall have to give two sets of prizes if we are to suit everybody—one for the animals that give the best showing on the block and one for sensational animals; the ones that show the highest development of the feeder's art. It is a well known fact that the sweepstakes winner a short time ago turned out so fat when killed that he was hardly any use. The same thing occurred in Chicago at the international exhibition. A Hereford steer that was scored very high by an English judge, brought over specially to judge at the Show, when killed, was entirely too fat—five or six inches right over the rib—a wonderful exhibition of what can be done in putting fat on an animal, and also in spoiling an animal for the market. When killed he was not in it for a minute with the carcasses of other animals that had not scored very high on the hoof.

Mr. DRYDEN: I should be glad if we could couple two things together at this show, first, the discussion of the carcass, and second, how to produce it from the breeder's and feeder's standpoint. I hope that another year we may be able to do something along that line

LECTURE ON CATTLE CARCASSES.

By J. H. GRISDALE, C.E.F., Ottawa.

The deduction from the carcass of the kind of animal from which it is produced requires a good deal of intelligence. You have before you two carcasses, one well finished and well shaped, and the other somewhat different,—for while it is of a beef breed, it takes somewhat of the character of an animal of the dairy breed, or of an animal more especially given to the production of milk. While this is a larger carcass, weighing some three or four hundred pounds more, the other has a greater length of hook. That is a weakness, and we find it in carcasses from a dairy class of animals. Such an animal when alive is sure to be too leggy and split up too far in the twist. We find lots of steers that, while they are fat and well developed generally speaking, have a depression at the loin, which detracts very materially from their value as beef carcasses. Prime beef and inferior beef is well exemplified in these two animals. The inferior one was a Devon steer, and the other an Aberdeen Angus heifer, and it is a very superior carcass. The steer was not finished properly; he may have been fed for a couple of months, but I

should say he would not be of advantage to the man who fed him. Unfortunately, the majority of our butchers pay as much for the one class of animal as for the other, and the reason we do not get a superior class of animals is because the butchers will take an inferior class, and the farmer finds it far too expensive to put the finishing touches on an animal in a low market. The flesh that pays him is that which is put on the cheapest, and therefore he does not finish his animals.

Mr. MILLAR, speaking from a butcher's standpoint, said that the fat carcass was too fat. He would not buy that class of beef because his customers would not take it.

Mr. FOULDS, of Brantford, concurred in this opinion, agreeing that the inferior carcass was better suited to their purpose.

Mr. GRISDALE took exception to this view, pointing out the necessity for producing a superior article. He said that if that is the kind of beef your customers prefer, then they require educating. Give our people a chance to taste superior beef, and after that they will ask for it.

Q. Would it not be in our interest to have a large slaughter house erected in this country?

Mr. FOULDS, Brantford: I think the country is too sparsely populated for anything of that kind.

Mr. DRYDEN: I have no doubt the butchers are perfectly right when they say the people want lean meat, but it is not the kind of meat that will bring the best price in the United States and in England. A little while ago we had all kinds of butter made in this country. To-day, you cannot go to a hotel and not get good butter. Customers now demand it. We are going to form public opinion on this question too. Then the butchers will find that they will have to buy a better class of beef in order to suit their customers.

JUDGING BEEF CATTLE.

By THOS. CRAWFORD, M.P.P., TORONTO.

Judging cattle is one of the most important subjects in connection with agriculture; that is to say, it is important that we should know how to do it in order to enrich our farms and fill our coffers where cattle-raising and feeding is practised. Now, a good deal of the success of feeding depends upon the judgment shown in buying. In buying steers to feed, two factors demand attention—they are, profit and quality. Quality in the prime steer is one of two kinds—one is in-bred and the other in-fed. We have in this steer before us both qualities. This animal is practically a pure Shorthorn, which we claim is the best breed for the butcher, and the breed that is, of all others, most profitable for feeding. He has a well-shaped, blocky form. We may say that this steer is very close to perfection so far as form is concerned. He has good quarters—that is, they come well down right to the hock. That is where you get your best cuts. When you have such quarters as this, you have an animal that will give you the greatest quantity of the most expensive meat and bring the best results so far as the block is concerned. Then, he has a wide loin, filled right up so that you can scarcely span it. He is close ribbed, well rounded, and deep bodied; standing not to high from the ground. That steer is about as near perfection as you can have it. This comes only from good ancestry. You cannot get a beef animal of the shape and build and style of the one we have before us from a Jersey, or Ayrshire, or a Devon. Even with a good many crosses on these, you cannot get an animal up to this standard of perfection. It is an illustration of the old saying, "Blood will tell."

As to in-fed quality: by this we mean the quality of the flesh. The flesh should be juicy and well laid on in the right place and properly mixed, lean and fat. This result is produced only by good feeding. We have an animal before us that is in accord with this description. We have one that has put on the flesh in even form, and it is well mixed. This is only brought about by having the in-bred quality to start on. Added to that, you have here the in-fed quality, resulting in an animal which, so far as we can judge, will be second to none when put upon the block. Pure-bred steers are sometimes

patchy. We generally got the best results from high grade Shorthorns. Next comes the Hereford. The Polled Angus is very good, especially for stable feeding. Galloways are fair; not so profitable as the others, as they do not grow so very large. The Devons are somewhat similar. Holsteins give weight, but they are not popular.

Q Has this steer any weak points?

Mr. CRAWFORD: No man or beast ever reached the stage of absolute perfection. While there may be some little weak points in this steer, I am free to admit that it is as near perfection as anything that has ever come before me, or anything that I have ever had the opportunity of pronouncing upon. He is very, very even, is well quartered and well got up, and as a fat steer, I do not know that I can point out any weak points.

Mr. DRYDEN: If we had ten thousand of them, they would be fit to go anywhere in the world.

Mr. CRAWFORD: The second steer we have before us is a good steer, but lacks in two or three places in the way of putting on the flesh evenly. On that account he is not so valuable as the first one, and will not command so high a price. Even when we get the right breed and what looks like the right feeding quality, we are sometimes disappointed when we come to feed. The animal will not lay on meat and make first-class beef as we think he ought to do. One of the principal causes for this is that animals are so often allowed to lose the calf flesh. When that has once been lost no amount of subsequent care and feeding will restore the loss sustained. Men who are both breeders and feeders almost invariably find better results from stock of their own raising than from that which they buy. The former have been kept growing right on from the start, while others frequently have not.

In buying stock for feeding, there are some points to be kept in mind The animal should be wide between the eyes; it should have large nostrils, but a small nose; the back should be straight, ribs well sprung, and hams well down; the animal should be wide between the fore legs, and have soft, silky hair.

That the quality of our beefing stock is not what it was is undisputed. There is more than one reason for this. The development of our dairy industry is one cause. Another is the use of immature bulls. Our bulls are practically used up, and turned off to the butcher at three years, just when they are approaching their prime. A bull cannot transmit to its offspring a quality it does not itself possess, and a bull under two or three years has not the full constitutional vigor it should have. Has it not lost its vigor by this time, used as bulls are now? That may be, but the point is this. Farmers should make their arrangements with a view of using their bulls up to four and six years, and then the animals will not be allowed to exhaust their vigor by excessive work while young.

One important point. Don't feed scrubs: it does not pay. Old Canadian, Jersey, Ayrshire, Devon, or Holstein cattle will not make profitable feeders. A good grade will make two pounds where a scrub will make but one. Even after you have fed a scrub, you cannot get the price, pound for pound, that you get for a good animal. If, however, you cannot get the kind you desire, and have a lot of feed, then in buying animals of a poor class, buy cattle of a good age, give them all the feed they will take, and get beef on them in the shortest possible time. You may in that way get enough out of them to pay for the feed But if you are careful and persistent, you can always find the in-bred quality. Then, with kind treatment and regular feeding, you will get the in-fed quality. If you do all these things well you will be sure to succeed.

Mr. ROBERT MILLER: If there is any point where farmers are deficient it is in knowing the value to place on different cuts in an animal. One difficulty that arises in judging an animal is to know how to balance up the good points in an animal with the bad ones I should like to know, for instance, whether it is better to have an animal thick through the loin or thick and well covered over the saddle; and I should like to have some idea from a butcher how much more valuable one is than the other. Every judge must find difficulties of this kind; for the reason that butchers and breeders view an animal from somewhat different standpoints. I think that in rings of this kind it is better to have one man classified as a butcher along with a breeder, because the breed has to be taken into consideration along with the fitting and finishing qualities of an animal. I have been in Chicago where butchers were doing all the judging, and have seen them make great mistakes; while on the other hand where the breeders have done all the judging,

the butchers were very much dissatisfied. I think that an animal should show a certain amount of breed character. There was one animal in the ring to-day that no doubt would be a splendid animal on the block, but he is not a good Shorthorn, or a good steer, or a nice easy feeder. He was fat and in handsome condition, and quite thin on the rib, and there were features about him that any breeder would like, while some butchers in the ring might have given him a prominent place.

I always place a good deal of value on the thickness of an animal's thigh, because it is there that value exists. In choosing an animal I want only head enough to show that the animal has a good constitution; and no more neck than is necessary. These features should be just as small as possible, while showing good constitution. We must have plenty of heart room, and room so that an animal can eat a good supply of food, but there must not be too much stomach. I don't like an animal narrow at the tail. I want a good breadth across the back in front of the hips, and the weight carried well down on the hips.

The first prize car of steers at Chicago had, in my judgment, too much stomach, although on the day they were shown, they were well served and looked straight. This means waste in killing.

As regards the red steer, I think he is as good as any I have ever had my hand on. I think he is a little past his best, as he is giving way on his legs, and is ready to kill. So far as form goes, there is no fault to be found with him.

Mr. DRYDEN: Mr. Miller suggests that there is probably a little difference between the opinion of the breeder or feeder and the butcher. In my opinion, the block is the end of the whole business, and we ought to be agreed as to what is wanted.

Q. The butchers would want them all hind quarters?

Mr. DRYDEN: Then breed them all hind quarters.

Mr. JOHN MCMILLAN: For a number of years I have purchased 150 steers every fall for feeding. One of the first things I examine about a steer is his head. I want a small nose, but large nostrils. Both these steers have this characteristic. Never buy an animal with a wild eye; get an animal with a mild eye, if you want him to feed properly. They must be wide behind the front legs, and have good breathing power. Otherwise they are not profitable to feed. They should also have fine, soft, silky hair. I thoroughly agree with Mr Crawford, that well-bred grades of the Durham breed are the animals that go into the British market, and make the best beef we ever get. They do not lay on in patches, as do pure-bred animals. When I speak of a good grade, I mean the product of a cow with six or seven crosses,—a cow in which the tendency to put on flesh rapidly and of the right quality has been developed. In breeding for beef animals, no one should ever use anything but pure-bred male animals, with a long line of descent, that have formed the habit of maturing early. You will then have no difficulty in getting steers of fifteen, sixteen and seventeen hundred pounds at two years.

Q. What kind of a horn do you like?

Mr. MCMILLAN: We never fatten with the horns on. I like them not standing too far up, but leaning a little forward, and turning a little in. We are not finishing our animals as we ought to do. One reason is, we do not receive sufficient extra price for a finished animal. If the buyers would pay the extra amount that a well-finished animal is worth, cattle would be better finished in Canada than they are. The farmer is anxious to get the largest amount he can possibly get, and it costs a little more to finish an animal thoroughly.

Mr. CRAWFORD: The fact that none of the buyers have grown rich, indicates that they are paying all they can afford to pay.

Mr. DRYDEN: Perhaps you are paying too much to the farmers who do not finish their cattle properly.

Mr. CRAWFORD: I think there are seasons of the year and sections of the country where we get animals as well finished as they are to the south of us, and I think such animals bring just as good prices as they do in Chicago. But the unfortunate part of it is that outside of the two or three months when the best stable-fed cattle come to the market, our cattle are little better than good stockers, in comparison with the cattle furnished in the Western States.

THE QUESTION OF FREIGHT RATES.

Q. When our cattle go up in price, space goes up, and the speculators in space on the ocean steamers get the benefit instead of us.

Mr. CRAWFORD : I think that is a point well taken. I tkink the Government ought to regulate, if possible, the matter of ocean and railway rates. A car of stock from Fergus or Elora to Boston will cost anywhere from $10 to $20 more than from Chicago. It will cost as much from Toronto to the sea-board as from Chicago. They come right through our country and over our railroads and get lower rates than we do. I want to say this, and I give it to you as a secret, there is a rebate to American shippers after that. This means considerable to the gentlemen who are exporting from Chicago. The farmer has to suffer for this.

Q. Why are the prices in Chicago so much higher than they are here?

Mr. CRAWFORD : We had in Toronto last week—and have every week—from three to ten loads of Chicago cattle. All I would ask you gentlemen to do is to see these cattle for yourselves, and you would understand the difference. You would find eighty, ninety, or a hundred per cent. of a car load equally as good as any animal here.

Mr. DRYDEN : We can produce them if we get the price for them.

Mr. CRAWFORD : The Chicago cattle are really cheaper than any we can buy in this country.

J. LOCKIE WILSON : The vital point has, I think, been touched upon with regard to this question of difference in price. It is in the cost of transportation. Three years ago I was one of a deputation that waited upon the Government and asked them to have a commission appointed to enquire into railway rates, but nothing was done. Since the new Government came into power I sent three or four sworn affidavits as regards the discrimination in rates, and there was a report sent to the Minister of Agriculture at Ottawa showing that the American farmer was allowed to ship his cattle at 22½ cents per hundred to Portland or Boston, while our farmers were charged .28 cents per hundred over the C P R., although the haul is 300 miles shorter. There is also a terminal charge of 3½ cents per cwt. that the American farmer does not have to pay and the Canadian farmer does. The present Government at Ottawa has promised a Commission to remove these grievances. Mr. Blair two years ago said that it was the intention to appoint a commission here similar to the Inter-State Commission in the United States. But nothing has yet been done. This is largely our fault. We have not brought the pressure we should have done. Let us make up for past inaction by demanding here and now that the Government shall secure authorization at the forthcoming session to appoint a commission with power to prevent our own railways, subsidized with our money, from discriminating against us.

A BREEDER : One reason for the high rate is that there is not sufficient space. Would it not be possible for the Government to subsidize more ships, and compel them to carry at a certain rate?

Mr. DRYDEN : I think we are getting to the bottom of the difficulty. This association represents the farmers and breeders of this country. We have our rights and intend to get them ; if not just now, then by and bye. Stand together, and we shall have influence with the Government, the railways, the shippers, and all these people.

Mr. MCNEIL : I move that this meeting of the most advanced breeders in the country memorialize the Government at Ottawa that we want a railway commission, and want it right away.

The Chairman put the motion and it was carried unanimously.

Q. Why does color affect the price so much as it does? For instance I see that in the Buffalo market "off colors" are 75 cents at least lower.

Mr. CRAWFORD : That is just where the wisdom of the men who have to do with the selecting and feeding of the stock in the Western States comes in. They select in large quantities and select nice strings of roans and reds. Many of these men would not take "off colors" if you were to give them for nothing. They want the best, and they find it pays. We have not enough cattle of the true beef type in this country, and our farmers are often forced to feed inferior animals—scrubs if you will,—and these do not pay, and will not command the price when they are marketed.

Q Do you not think the dairy interests have injured the export beef trade?

Mr. CRAWFORD: Yes, I think that is correct. I think it is time that the Government took up this matter and did something to encourage the importation and distribution of the right quality of sires throughout the Dominion. I am told that something is to be done in that direction, and I am glad to hear it. I think the farmers make a mistake in discarding sires at too early an age—just at the time they are in their prime. Lack of vigor and development is the result.

Q. Is it not true that the Northern Pacific in the United States has been carrying pure bred bulls free in order to encourage the beef industry?

Mr. CRAWFORD: Yes; I believe so.

Mr. DRYDEN: I should like to point out that our own railway companies have done everything that we felt justified in asking them to do. Pure bred animals are now transported for half the regular rate. We have made an arrangement with the C. P. R. whereby a bull can be taken to the Northwest even cheaper than to Ontario points. The only way you can approach the railway people is to show them that it is in their interest to develop the trade of the country. It is useless to approach them from the standpoint of the private breeder. This Association has done a great deal already in this way.

Q But we are discriminated against in favor of the American farmer?

Mr. DRYDEN: Yes; that is another thing, and something ought to be done in that regard. Mr. Hodson has these things in hand, and I have no doubt that in the near future we shall have things arranged in some definite shape.

REPORTS ON CATTLE, SHEEP, AND SWINE.

A prize of five dollars to be competed for by students at the Ontario Agricultural College was offered for the best report of each of the cattle, sheep and swine departments of the Winter Fair. No student was allowed to report on more than one department. The prizes were awarded to J. F. Ferguson, Spring Hill, Ontario, in the cattle department; B. C. Gilpin, Gorrie, Ontario, in the sheep department, and to W. J. Rutherford, South Mountain, Ontario, in the swine department.

The following are the reports:

CATTLE.

The 17th Annual Provincial Fat Stock, Dairy, and Poultry Show was held in the immense new building recently erected on the Market Square of Guelph. It is a matter of congratulations to the citizens of Guelph and the surrounding country that they have this great Show now permanently situated in the "Royal City."

Every department was taxed to the utmost for room, and it was beyond a doubt the most representative and meritorious show ever held in Canada. It was, as Hon. John Dryden said, a combination of an Agricultural Fair and a Farmers' Institute. The attendance was thoroughly in keeping with the excellence of the exhibition, as visitors poured in from the Maritime Provinces, from the far West, and many from across the border. Officials, exhibitors and visitors, one and all, expressed their entire satisfaction with the building and with the treatment they received.

Among the many educational and instructive features of this year's Show, was the block test, which included cattle, sheep and swine. The slaughter-house is fitted up with all the latest improvements and appliances for slaughtering. Valuable and interesting lectures were delivered on the carcasses by men who thoroughly understand their business. The block test has fixed more firmly than ever in the minds of progressive farmers of Ontario, the ideals towards which they should strive.

The judges on cattle were John Gibson, Denfield, and Robt. Miller, Stouffville, both of whom are well known in the ring.

Shorthorns. Shorthorns headed the list in the catalogue. In the section for two-year old Shorthorn steers, J. Fried & Sons, Roseville, carried off the red ribbon with

"Wild Bill," a very square, well finished steer, of good quality and tipping the scales at fifteen hundred and ten pounds. This steer also won the sweepstake prize for dressed carcass of any breed. Israel Groff was easily first in the section for steers one year and under two. He had a beautiful pure white steer "Crimson Robe", who is short enough on his legs, has a perfect upper line, and the broad, thick loin in front of his well covered and smooth hips could hardly be better. He won the sweepstake for best Shorthorn steer. Peter Stewart, Everton, came second with another steer of very good quality, which was sold to J. A. Leaman & Co., Halifax. The next section called for cow or heifer three years and over, and was keenly contested, First honors was eventually carried off by W. J. Biggins, of Clinton, with "Matchless of Elmhurst 18th". She is a fine three year old heifer, scaling fifteen hundred and forty pounds, and was deep and ripe. She was one of the good cows of the Show, being low to the ground, very thick and had a wonderful heart girth. Following closely were Daniel Talbot, of Everton, with "Dorothy Fox", and John Campbell, of Woodville, with "Crimson Maid". Mr. Talbot's cow is also very "Scotchy" in her make-up. She is a big, thick, short-legged cow which will always be attractive, no matter what company she is in. Next came H. K Fairbairn's "Maid of the Mist" which along with "Matchless of Elmhurst" ended her live career in the block test. In the section for heifers two years and under three, J. Fried & Sons won first place with "Roseville Maid", a fine, mossy-coated and promising heifer with a good even covering of flesh. H. Smith had a clear winner in the yearling heifer section with his beautiful white heifer, "Barmaid". She is a model in shape, and her quality and style are of the best. To her went the special prize for best Shorthorn cow or heifer. She was sired by the same animal as "Free Trade", the sweepstakes steer at last year's Show, and is thus upholding the reputation of her worthy sire, "Abbotsford".

Herfords and Polled Angus. Herfords and Polled Angus were shown together. Very few cattle were shown in this class, but the quality was good if the quantity was lacking. It is a matter of surprise that more Polled Angus cattle are not bred, when we consider the success of these cattle at Chicago's great Show. The F. W. Stone Stock Co. won in the section for two-year old steer or heifer, with a well-fleshed, short-legged, broad-backed, typical white face. Mr. Bowman, the chief exhibitor of Polled Angus cattle, carried off second honors with a beautiful, round-bodied heifer. The F. W. Stone Stock Co. also carried off the red ribbon in the yearling steer or heifer section, with "Graceful", a name which suited the animal well. Second to her was placed a pretty steer of Mr. Bowman's, which will before long make a fine butcher's beast. Next came "Bessie Blooming", a very typical animal exhibited by A. McDougall, of Guelph. The prizes were well divided among the exhibitors in the next section which were for steers or heifers under one year. A new exhibitor, Samuel Young of Binkham, headed the list this time with a nice little Polled Angus heifer, "Springside Beauty". He was closely followed by the F. W. Stone Stock Co, James Bowman, and A. McDougall in the order named. The first prize in the three year and over section went to Mr. Bowman. His heifer was in the pink of condition, was stylish when still or in action, and was as round and plump as a cherry. Second honors went to the F. W. Stone Stock Co., while James Bowman followed with a good third.

Galloways and Devons D. McCrae, Guelph, and W. J. Rudd, Eden Mills, were the chief exhibitors of these breeds; the former showed Galloways and was first in all the sections. The pretty heifer, "Ranee 13", which won first in the section for two year old steer or heifer, is indeed a very typical animal, being very smooth in her shoulder, and her girth is all that could be desired. She is evenly fleshed all over, and her long, curly black coat gives her a very handsome appearance. Following her were W. J. Rudd's two Devon steers which were entered for the block test. There carcasses were excellent examples of what is wanted for the local markets. The section for steers or heifers under one year brought out some fine youngsters. D. McCrae's winner was a dainty calf of most impressive character, being "wooled" down to the toes, and is made up to mature into something extra. T. Lloyd Jones & Sons, Burford, claimed second place with another fine little heifer. In the yearling section McCrae's "Valetta" had to give away to another one of greater length, owned by the same exhibitor, while a large blocky, typical cow placed another prize to his credit in the section for cow or heifer three years and over.

Grades or Crosses. Here was seen the great aptitude of the Shorthorns for mixing with the other breeds of cattle with which they are crossed. The first section called for steers two years and under three. This brought out eight entries, and a very straight and well fleshed lot. The first honors fell to "Clinker" who weighed 1820 lbs., an almost perfect steer belonging to James Leask, the well known breeder of Greenbank. "Clinker" had a blocky form, good quarters, wide loin, close ribs and deep body; stood straight on his feet, showed robust constitution, and in short, was all that could be desired. He won the sweepstakes prize for the best steer in the Show, and along with "Flo" a heifer of Mr. Leask's, won the silver cup donated by the Bell Organ & Piano Co. These animals were both sired by "Moneyfuffel Lad", the well known stock bull which has won sweepstakes himself in the leading Show, and has furnished calves which always get near the top at exhibitions. The second prize went to another excellent steer "Look Out", belonging to J. Fried & Sons. He had a capital back and was famous in his chine and best cuts. He was considered the second best animal in the Show. Mr. R. J. Robinson, Ailsa Craig, furnished the third winner in a large, blocky steer of good quality. He was followed closely by an excellent animal belonging to Peter Stewart, which was highly commended, while a fine white steer by Geo. W. Hill came next. The section for yearling steers was keenly contested, James Leask again carrying off the red ribbon with one of "Moneyfuffel's" progeny. He is a low thick fellow with an extra spring of rib, and is a typical feeder's beast all over. Andrew Richardson, Peepabun, was placed second with a blocky, low-set steer of great merit, while third honors went to J. H. Dingle, Hamilton. A good steer, "General White", belonging to John Campbell, of Woodville, was highly commended, but was closely followed by an entry of James Lindsay, of Fergus. The next section contained some pretty steers under one year. There was little trouble in selecting "Jumbo", shown by A. Hales, Guelph, for first places. He has good scale and length for his age; a fine front, back and loin, and a mossy coat of roan hair. Next came a little beauty belonging to Andrew Richardson, Peepabun. This steer, "Bobs", is built upon short pins, and is every inch of him a show type. James Leask secured third place with a very promising young steer which has an excellent front. Next came George Clayton, Peepabun, and J. Fried & Sons, each good steers. Of cows or heifers, three years and over, there were four entries. First place easily went to James Bowman, for a glossy, Polled Angus Grade, which met with great merit in the eyes of butchers. Next came William Argo, Eden Mills, with "Everhill Lass", a low-down blocky cow and a very good handler. John Brown, Galt, secured third place with a fine white cow which showed just a little plainness about the shoulder. He was closely followed by James Leask with a good butcher's in the beast. "Flo", weighing 1800 lbs belonging to James Leask, rose like cream to the top in two-year old section. She is an inspiration and a feast to the eye. Her rich mossy coat of hair, her extreme finish, her shapely outlines, including a width of back that older animals do not often attain, together with a rare style and presence, combine to class her among the rarities of excellence, that our show yards have brought out. To her went the special prize for best animal, any age or breed. This was a silver cup donated by Thomas Holliday, Guelph. This placed the two silver cups in the hands of James Leask. Another short-legged, thick quartered heifer, richly furnished all over with flesh, put another first prize to the credit of James Leask. Mr. James Scott, Aberfoyle, and Mr. Rudell, Hespeler, had rather a close contest for supremacy, third place eventually going to the former, who also secured fifth place; Mr. Rudell's heifer being highly commended. The yearling heifer section had at its head the beautiful heifer, "Daisy", but she had a formidable competitor in one of James Leask's which was very shapely and compact, but no of length and scale of the winner. Robert Dawson, Guelph, brought out the third prize heifer, and George Clayton, Peepabun, the fourth. The next section was keenly contested and brought out Grade steers sired by a pure-bred shorthorn bull. In this section appeared a regular mountain of beef, owned by Mr. Waechter, of Teeswater, which weighed three thousand pounds. This monster is going to be exhibited in shows throughout Canada and the United States next year, and no doubt will secure much money for the exhibitor. "Clinker" however, secured the red ribbons and bore them proudly away. The sale of "Clinker" and "Flo" to Puddy Bros., Toronto, for ten and one-half cents per pound, ends their very brilliant carreer.

Sheep.

The exhibit of sheep was remarkable for numbers, and the quality could not be beaten, not even in Chicago, for some of the winners there had to take lower places here then they were awarded at the International Exposition. The roomy and comfortable pens of the new building were well filled The ewe lambs made the strongest section in most of the breeds, but in the Shropshire and Southdown breeds, the wethers were more than strong.

Cotswolds. John Park & Son, Burgessville, were the only exhibitors of this breed; they had sheep for every section, all sired by the ram Hopeful. Their ewe lamb which took first place is hard to beat; she is a typical Cotswold in form and fleece, and stands on a good set of legs. They also brought forward three yearling wethers, and three wether lambs.

Lincolns. The exhibitors in this breed were J. T. Gibson, Denfield, and Leonard Parkinson, Eramosa In the ewe lamb and shearling wether sections Gibson took first money. His ewe lamb, Gibson's 22, is a splendid long wool with grand constitution and an extra strong back. In the pens of three, Parkinson took 2nd and 3rd places. In wether lambs the honors were divided, pride of place going to Gibson's 17, closely followed by Parkinson's Bobs; Gibson's 16 was 3rd, and Parkinson's Buller, Highly Commended. First for pen of wether lambs went to Gibson.

Leicesters This breed was well represented. Ewe lambs were the main feature of the class. The distribution of prizes shows the keen competition.

In the ewe lamb section A. & W. Whitelaw, Guelph, took the position of honor with Lady White, a lamb that has in her the makings of a splendid dam; her widely sprung fore-rib and beautifully topped fleece are visible indications of her excellent make-up, and a closer examination is not disappointing. She also won the sweepstakes prize for the class. The same firm had two other good ones which stood third and fifth in awards. John Kelly, Shakespeare, had the honor of winning second place with Avonhead Lass, a grand lamb, but hardly so well wooled as the first prize ewe, and his "Trix" was Highly Commended.

Orr & Lillico, Galt, took first and second in shearling wethers, and first, fourth and commended in wether lambs. John Kelly came second with Wrangler and third with Bobs.

In the section for wethers under one year, Orr & Lillico won first with their prize lambs, and third with another pen, but had to leave second place to John Kelly. In pen of ewe lambs A. & W. Whitelaw stood first and John Kelly second and third.

Oxfords The ewe lamb section in this class was the best feature of the sheep exhibit as regards numbers, and the judge said that the first prize ewe was better than anything he had judged at the Chicago Fair.

The first prize ewe lamb, which also won the sweepstakes for the breed, was Kenneth Finlayson's 95. She was a typical Oxford from the tip of her dainty nose to her tremendous leg of mutton. Her fleece was of the sensational order, her skin a beautiful cherry, and altogether she was a lamb that Mr. Finlayson might well be proud of. Her imported sire, Kempford Hero, 8th, again showed his prepotency in being the sire of Finlayson's 94 which was commended. Smith Evans, Gourock, stood a good second, Andrew Elliott was third, and J. H. Jull's, Brant Queen was highly commended.

Andrew Elliott of Pond Mills, had no opposition in the yearling wether class. In wether lambs Smith Evans took the money prizes with a splendid trio For pen of three ewe lambs, Kenneth Finlayson held the place of honor with three of Kempford Hero's get. Smith Evans took second with his best pen, and his other pen was highly commended, while J. H Jull's entry was third and Andrew Elliott's pen 5th.

Shropshires. This class was well filled in every section, about forty sheep coming forward altogether. The pick of five flocks entered the ring when ewe lambs were called out. After sometime the judge made the awards, first and second going to John Campbell's 971 and 963, a straight lengthy pair of typical Shropshires, and, to all appearances, as like as two peas, but 971 had rather the better of it in the hind quarters. D. G. & J. G Hanmer also brought out two prize winners. John Campbell won first and second in the yearling wether class also. His first aptly named The Model, is an excellent specimen of the breed; the marking about the head was perfect and the form through

out hard to fault, though he was rather on the fat side. Hanmer, Gibson, and Beattie took places in the order named.

R. Gibson swept the board in the wether lamb section, taking four of the five awards. His appropriately named King of the Show, won first in his class and sweepstakes for the class over Campbell's fatter wether; he was a wonderfully firm handler. R. Gibson had also the two best pens of wethers. The money for pen of ewes went respectively to J. Campbell, D. G. & J. G. Hanmer, and A. Rudell.

Shropshire Specials. Twenty-one ram lambs came forward. First and second for best pen of three went to John Campbell who brought out six good rams. The Magistrate, a blocky, low set fellow, was particularly good, but was not far ahead of his mates. In the section for best shearling wether out of a Shropshire ram, John Campbell won first and T. Lloyd-Jones & Sons, Burford, second.

Dorset Horns and Merinos. R H. Harding, Thorndale and W. E. Wright, Glanworth, were the only competitors, Mr. Harding carrying off all the prizes with the exception of first for yearling wether.

Grades and Crosses. There were six sections in this class and more than thirty-five sheep were entered. John Campbell was the largest winner in this class, taking three firsts, three seconds and some ribbons. Others who came well up in the list were W. E. Wright, J. T. Gibson, T. C. Douglas, R. Gibson, Orr & Lillico, and Telfer Bros. This was a hard class to judge on account of the long, medium, and short wool grades showing together in the competition.

Swine.

Much has been said and written about the bacon hog, but nowhere could he be seen to better advantage than at the Winter Fat Stock Show. It is encouraging for the promoters of the bacon industry to see what improvement is being made in the production of hogs suitable for furnishing the packers with material with which to supply the British market with first-class Wiltshire sides, for which Canada, especially Ontario, is becoming justly famous. Notwithstanding the exhibit of some No. 1 bacon types, still the improvement is but begun. It yet remains for the great body of producers throughout our country to grapple with the problem.

The great crowd of interested spectators eagerly pressing around the judges in this department, in order that they might, if possible glean a little information as to the points of excellence, was a remarkable feature of the Exhibition. All seemed bent on gaining that information so important to-day, if as a country we are to hold our place against our keen competitors—the Danes and the Irish—in the markets of Great Britain.

Most classes were well represented, though in some the work of the judges was lightened on account of the lack of competition. The first place in point of numbers was taken by the Tamworths, followed in close succession by the Yorkshires, Berkshires, Chesters, Durocs, Poland Chinas, and Essex.

Tamworths. This popular breed was conspicuous both in number and excellence. Among the successful exhibitors, were Douglas & Sons, Mitchell; Elliott & Son, Galt; George & Sons, Crampton; A. Elliott, Pond Mills; Norman Blain, St. George; A. C. Hallman, New Dundee; W. M. & J. C. Smith, Fairfield Plains; W. R. McDonald, Ridgetown, and Newell & Sons, Crampton.

In the barrow class, between six and nine months, Blain, of St. George, carried off first prize with a long, even-sided pig, while Elliott, of Pond Mills, and Douglas & Sons, Mitchell, won second and third respectively. "Surprise," with good, strong, well filled loin, good length and depth of side, secured first for A. C. Hallman for barrow under six months, and second and third honors went to McDonald and Blain. Blain again headed the class for sows over nine months and under fifteen, with "Thrifty Maid," a model in point of type and finish; Elliott & Son, and Smith Bros. being second and third respectively. Sows between six and nine months gave the judges a critical piece of work to perform. Fifteen came into the ring. First choice a handsome sow with light jowl and neck, smooth shoulders and evenness throughout, led for Elliott & Son, while second and third places were taken by choice sows belonging to Elliott, Pond Mills, and Douglas & Sons. In sows under six months there was a close competition, but finally the red ribbon was borne off on the strong, well-filled loin of "Rosy O'Grady" for Blain; the blue also

going to Blain on "Nancy," while the white went to Newell & Sons. N. Blain, of St. George, came in for the sweepstakes

Duroc Jerseys. W. N. Tape, Bentpath, had a good representation of these hogs, and having no opposition except in sows between nine and fifteen months, carried off all the prizes except a third which was taken by W. M. & J. C. Smith, Fairfield Plains.

Chester Whites Thirty-three entries were made in this class chiefly by the exhibitors who were foremost last year in carrying away the laurels. Among those showing were D. DeCourcy, of Bornholm ; George & Sons, Crampton ; Bennett & Pardo, Charing Cross. Many animals showing careful breeding and feeding, were brought out for the judges' decision. The over-fed, fat, broad-backed hog lost each time to his leaner competitor. The judges here, as in all other classes, discriminated in favor of the consumer, though breed type was not lost sight of.

Bennett & Pardo led off by scoring first and second on barrows between six and nine months, and first on sow under six months ; George taking second place, while DeCourcy took third in each case. DeCourcy then came in for a first and second on barrow under six months, and first on three pigs the off spring of one sow, while Bennett & Pardo reached third. Now it was George & Sons' turn, and their nicely turned sows in the class between nine and fifteen, and six and nine months, carried off two red ribbons for him. Blue ribbons went to DeCourcy's pens, while the whites went to Bennett & Pardo and DeCourcy, respectively. There was a sharp contest for Sweepstakes, but George & Sons triumphed.

Poland Chinas. W. M. & J. C. Smith, Fairfield Plains, had this breed all to themselves, leaving them easy winners in all classes.

Berkshires. This worthy breed was not wanting either in numbers, type or quality, being reared and fed for practical utility by the following breeders : George Green, Fairview ; Snell & Lyons, Snelgrove ; Russell, Precious Corners ; Rudd, Eden Mills ; Agnew & Sons, Acton. The prizes were fairly well distributed between Green and Snell & Lyons. Green, of Fairview, seemed to have a preponderance of red ribbons at the finish. In barrows between six and nine months, "Black Sam" and "Black Jack" carried away the red and white ribbons for Green, while the blue went to Durham & Cavan on "York Lodge Fashion Boy." Green was again the successful competitor on barrows under six months, with "Duke" first and "Bert" second, while "Kruger" a worthy pig, won third place for Snell & Lyons. The tide turned when a handsome lot of sows between nine and fifteen months came into the ring. Again the contest was hot, but eventually, "Lady Shields" secured the red for Snell & Lyons, while "Artful Belle" and "Golden Drop" were adorned with the blue and white for Green. Hotter still became the contest and keener grew the interest of the spectators when fifteen handsome sows between six and nine months with almost perfect lines and hams, were driven into the ring for judgment. Notwithstanding the whisperings around them the judges worked with admirable coolness. Here was one discarded for too heavy a jowl ; there one for crown on neck ; another for arch over the shoulder, weakness of heart girth, too much fat, too much width, and shortness of sides. All were sorry to see "Miss Harding," "Acton Bell" and "Morning Maid" discarded, yet satisfaction prevailed when Green's "Model Queen" walked out with first honors, followed closely by Snell & Lyons' "Miss Prim" and the "Duchess." In sows under six months, "Pleasant Maid" and "Lady Maid" won first and second for Snell & Lyons, and "Black Polly" third for James Russell, Precious Corners. "Morning Lily," "The Duchess" and "Morning Maid" again came into the ring as best three, off-spring of one sow, and contested successfully for Snell & Lyons against Green's "Model Queen," "Black Sam" and "Back Jack."

For the Sweepstakes, three handsome sows were presented,—large, medium and small. All three possessed so many admirable qualities, that the judges, Messrs Harding and Jones, disagreeing for the first time apparently, called in Mr. G. B. Hood, of Guelph, who, after careful judgment, decided in favor of Green's nine month's old sow, a model of beauty and finish with fine quality of bone.

Essex. A number of pigs were shown in this breed by T. A. McClure, Meadowvale, and Jos. Featherston, Streetsville. Though Featherston's exhibit doubled McClure's in point of numbers, yet McClure had the quality and evened up for first place with his competitor. McClure won first on barrow six months and under nine, on sows between nine and fifteen months, and on sows under six months ; also third place on

barrow under six months and sow between six and nine months. Featherston captured the remaining prizes together with the Sweepstakes.

Yorkshires.—Many very excellent bacon types presented themselves for criticism. The successful competitors were,—Brethour & Saunders, Burford; J Featherston & Son, Streetsville; H. Dedels, Breslau; and James Russell, Precious Corners.

In barrows between six and nine months, Brethour & Saunders' "Oak Lodge Nip" a long, smooth, even-sided pig, won first honors from Dedels' "Jack," a good serviceable pig but a little weak behind the shoulders and a trifle fat. Third place went to "Oak Lodge Tuck" for Brethour & Saunders This firm came in for first and third places again in barrows under six months, while Featherston scored second with "Buller," a splendid pig worthy of his name. Honors were still due the former winners when "Oak Lodge Julia" was brought in to contest first place with Dedels' "Summerhill Fame" and Featherston's "Whitston Maid." The winner, "Oak Lodge Julia," was a model of excellence with a light head and neck, smooth shoulders but not too light giving good strong chest and heart girth, with lots of length, evenness and quality. Featherston now came in for his share, winning first on sow between six and nine months, while Brethour & Saunders dropped into second and third places. Eight handsome sows under six months, gave the judge a heavy piece of work, but at the finish the red and white ribbons saddled "Oak Lodge Pride 14th" and "Oak Lodge Pride 15th" for Brethour & Saunders. while "Mattie" bore away the blue for Dedels. First and second ribbons again went to Brethour & Saunders for three best pigs, the offspring of one sow, while the same firm came in for Sweepstakes with a handsome sow fifteen months old.

Grades and Crosses.—What this class lacked in numbers was more than supplied by quality. Here was the ideal bacon hog,—not a Berkshire, Tamworth or Yorkshire, but a happy medium,—the popular cross being Yorkshire on Berkshire, Tamworth on Berkshire, or Tamworth on Yorkshire. In a Yorkshire cross, the characteristic features in every case was stamped upon the offspring.

Robert Agnew, of Acton, won first on barrow between six and nine months; also the same honors fell to him on barrow under six months, a cross of Yorkshire on Berkshire, while a Tamworth-Berkshire cross took second place for Elliott & Son, Galt; third went to Blain, St George. Blain now evened the score on sows between six and nine months by capturing first with a two cross Tamworth-Berkshire; McDonald and Elliott & Son coming in for second and third places.

"Priscilla," a handsome cross of Yorkshire on Berkshire, took honors for Snell & Lyons in the section for sows under six months "Rosa" won for Agnew & Sons, while third was taken by "Spot," a Tamworth-Berkshire cross, for Elliott & Son.

Bacon Hogs.—G. Green, Fairview, showed the two best Berkshires, being close run by Rudd, Eden Mills, and James Russell, Precious Corners.

Brethour & Saunders scored first place with Yorkshires; G. B. Hood, Guelph, and Featherston & Son, Streetsville, taking second and third places.

In Tamworths, "Kruger" and "Maybe," a fine pair of "baconers," walked away adorned with the red ribbon of Blain's tent. Good pairs belonging to Elliott & Son, and George & Sons, were decked with blue and white.

The Chesters offered a sharp contest, but eventually the honors rested with W. E. Wright, Glanworth, followed by Harding and DeCourcy.

W. M. & J. C. Smith, Fairfield Plains, had it all to themselves in Poland Chinas.

W. N. Tape, Bentpath, had no opposition in Duroc Jerseys.

The Essex pigs made a good showing, Featherston coming in for first and second, with McClure an easy third.

In the Grades and Crosses, as before, the almost ideal forms and finish came in. Elliott & Son, Galt; Agnew & Sons, Acton; George & Sons, Crampton; and Rettie Bros., Norwich, all made a good showing, but honors rested with Elliott & Son, Rettie Bros. and Agnew & Son getting second and third respectively.

There was a great round-up for the Sweepstakes; no less than seventeen entries of Yorkshires, Tamworths, Berkshires, Essex, Duroc, and Poland Chinas, with a good sample of Grades were entered. It was quite evident that the judges had a task before them. When the honors were distributed however, the red went to Brethour & Saunders, the blue to G. B. Hood, and white to Featherston. Rettie Bros. showed a model pair of crosses which when subjected to the block test, not only led their own class but also in

the Sweepstakes for best two carcases in the test. Two red ribbons were draped over their lifeless forms as they hung exposed to the gazing throng. One of this pair has also the renowned distinction of being pronounced to have had the best Wiltshire side ever examined by Mr. Flavelle, Manager of the William Davies Packing Co., Toronto.

R. H. Harding, Thorndale, and William Jones, Mount Elgin, acted as judges on Yorkshires, Berkshires, Tamworths and Grades.

Thomas Teasdale, Concord, and G. B. Hood, Guelph, judged Poland Chinas, Chester Whites, Duroc Jerseys and Essex.

The bacon classes were judged by representatives of the pork packing establishments.

REPORT OF THE BLOCK TESTS AT THE PROVINCIAL WINTER FAIR.

By Professor J. B. Reynolds, O. A. C., Guelph.

One of the lessons to be learned from the block test in swine is that it is very important for the feeder to know when the animal is ready for market. It is much easier to leave the animal unfinished or to feed a week or two too long than it is to know just when the right condition is reached. A number of the carcases slaughtered at the show were unfinished; and, at the packing house, an unfinished carcase commands a lower price per pound, because the quality of the meat is poorer than it is in better finished animals. But there was more error on the side of feeding too long. After a certain stage is reached, according to the demands of the English market, the feed given is practically wasted, since it is turned to fat by the animal, and the superfluous fat serves only to lower the grading quality of the hog. There were two conspicuous illustrations of feeding too long. In reply to letters sent inquiring about the condition of the animals slaughtered, Mr. A. C. Hallman reports that his Tamworths, according to his opinion, had been kept a week too long, and were over-ripe. These animals were graded at the packing house as medium fleshy (too fat for best selection). If they had been slaughtered a week earlier they would in all probability have graded No. 1.

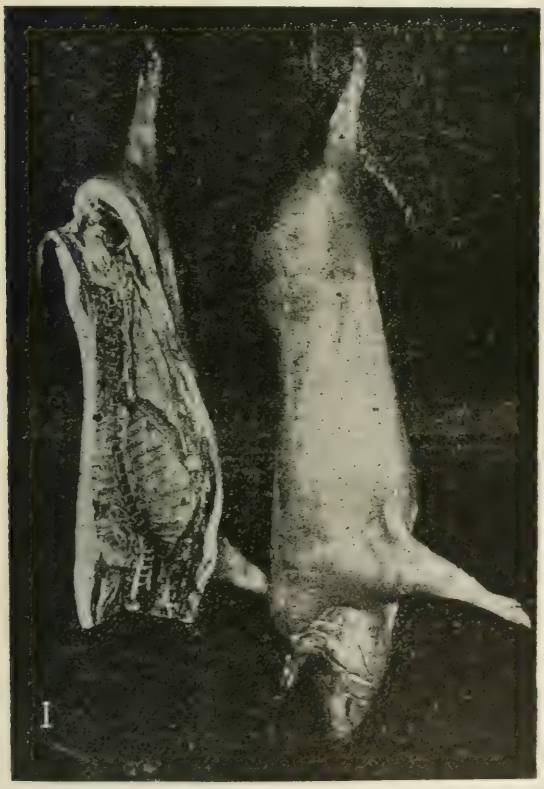

Figure I.—Wrong type for bacon hogs, Note, 1. The short side. A long side is desirable because this part between the shoulder and the ham furnishes the choicest cuts and brings the best prices. 2. The short thick ham. The left side of the figure shows what this form of ham means—a tendency to too much fat. 3. The arched crown—a sure sign of being predisposed to fat. 4. The excessive thickness of fat over the back and round the ham.

Mr. Blain reports that a pair of his grades were too fat and had been held back. One of this pair ranks fat and the other medium fleshy.

Generally speaking, the block test has been the means of causing a decided advance in the quality of the bacon as compared with that shown in 1899, more especially in those

breeds that are capable of improvement in the direction of the bacon type. The Yorkshires, for a large class, were exceptionally good, and showed a marked improvement over those exhibited last year. The largest class, the Tamworths, have not equally improved, and there appeared to have been less care in bringing them just to the correct condition.

The grades are pushing themselves rapidly to the fore, both in number and quality. Last year four grades were shown, and two of these were 20 and 40 pounds respectively over weight. This year eight were shown, of which six graded No. 1. A pair of grade carcasses also won the sweepstakes.

FIGURE 2.—Correct form, but fed too long. Note, as to form, 1. The long, tapering ham and head, and light jowl. 2. The long side, and even depth throughout from shoulder to ham. If this animal had been killed some weeks earlier it would have been worth more to the packer, and, under a proper system of graded prices, would have brought more to the producer. Note the excesssve amount of fat carried.

The American classes—Poland-China, Duroc-Jersey and Chester Whites were not exhibited in as large numbers as last year. The judges awarded no prizes to any of these classes.

There is also a great improvement in the quality of mutton shown. Last year, the general complaint of the judges was that the mutton was too fat. While there is a much larger exhibit this year, only two mutton carcasses were decidedly too fat. Any errors, however, were still on the same side as last year,—a tendency to make yearlings too fleshy and to leave the lambs too thin. This tendency was quite evident in looking at the carcasses, and is plainly brought out by the judges' awards. In nearly every case, the prizes went to the lightest carcasses in the yearlings and to the heaviest classes in the lambs. As in the swine classes, the first prize sweepstakes went to a grade.

RELATION BETWEEN SHRINKAGE AND QUALITY. This year we were able to secure some uniformity in the fattening of the animals to be slaughtered ; and, as a consequence, the results are more uniform and satisfactory. The accompanying tables relating to

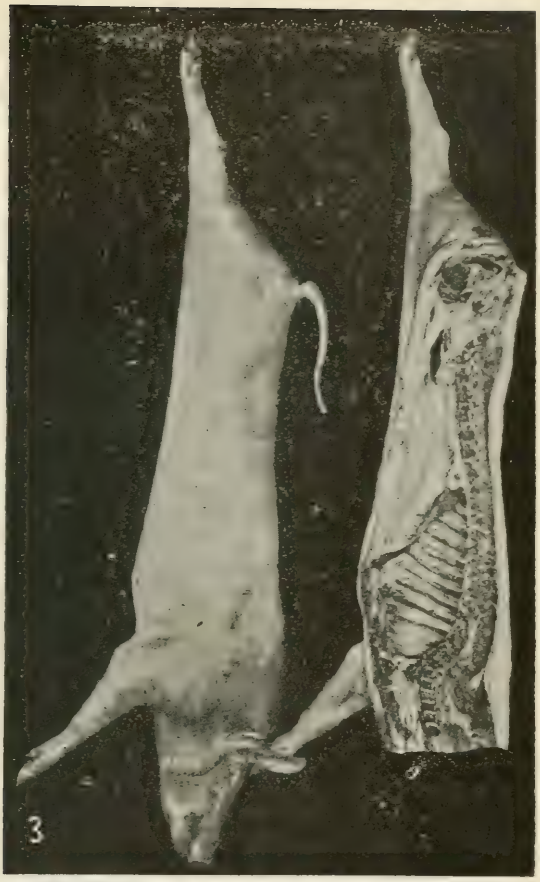

FIGURE 3.—A lean old stag. Quite unfinished, and quite undesirable, rated by the packers at 4 cents a pound. Note, 1. The lean ham and coarse scrawny head. 2. The side, long enough, but altogether too light and thin.

FIGURE 4.—A prize carcass. Won sweepstakes for all breeds. Note, 1. The long, tapering ham, quite fat enough, as is shown by the left half of the figure. 2. The long side, and comparatively light crown. 3. The evenness and proper thickness of fat over the back. 4. All that need be said of the head is, that it is typical of the breed.

the per cent. of dressed weight show that this percentage does not vary uniformly with the quality of the carcasses. The fatter animals almost invariably dress a higher percentage than the leaner ones.

In the sheep, there is practically no difference, as the table shows, on the average between the first prize carcasses and the average carcasses, but the following table showing the relation between the percentage of shrinkage and the prizes won indicates that in the yearling classes the percentage decreases with the quality of the mutton; but in the lamb classes, on the contrary, the percentage increases with the quality of the meat, as indicated by the prizes. All these results go to show that high percentage indicates a greater amount of fat; and, since excessive fat is undesirable in the markets, it appears that to dress a high percentage is no longer an unalloyed virtue in either sheep or swine.

PERCENTAGE OF DRESSED WEIGHT, SHEEP CARCASSES.

	1 year and under 2.		Under 1 year.	
	Average for class.	First prize carcass.	Average for class.	First prize carcass.
Cotswold	65	65	..	..
Dorset	62	64	55	57
Grade	63	62.5	57.5	58
Lincoln	..	..	56	53.5
Leicester	..	..	57 5	56
Oxford	60	61 5	57.5	57
Shropshire	62	60	56	59.5
Southdown	64 5	65	57.6	59.5
Suffolk	62 5	63	..	..
Average	62	61.5	57	57

SHOWING RELATION BETWEEN PER CENT OF SHRINKAGE AND PRIZES WON.

	Yearlings.			Lambs.		
	1st.	2nd.	3rd.	1st	2nd	3rd.
Shropshire	60	62	64	59.5	55	53
Southdown	65	64	62	59.5	57	56
Grade	62 5	63	65	58	57	55
Average	62·5	63	63.7	59	56.3	54.7

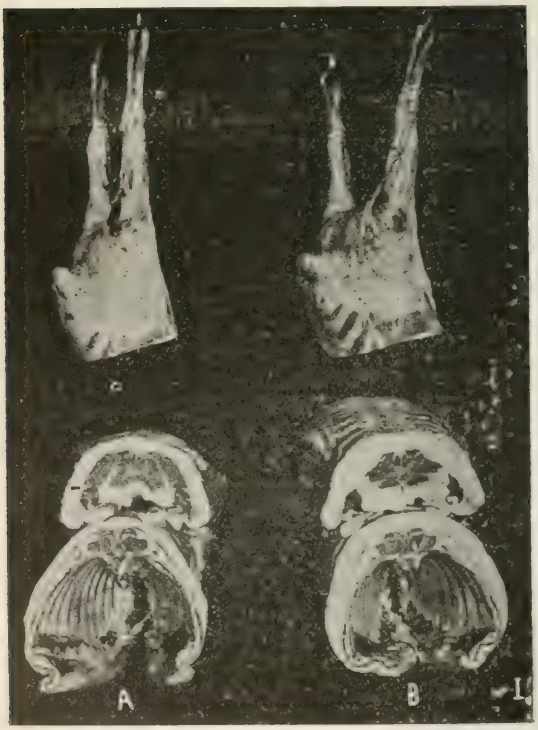

FIGURE 5.—First and third prize sheep, respectively, in the same class. Note, 1. The difference in the amount of fat. As between these two, B loses chiefly on account of excess of fat. This animal had been prepared as a prize animal the year before, and had been kept over. Fed altogether too long to be profitable, either commercially or for prize purposes. The broad heavy rump indicates fat throughout. 2. In the live class, B won second, and A won no prize. Here is a point for the judges in the live classes to consider.

Comparison of Decisions on the same Animals Alive and Dressed. There is a pretty fair agreement between the decisions of the judges in the live classes and those of the judges in the block test.

Among the swine the pairs in the Yorkshire, Berkshire, and Essex classes are given the same standing relatively in the live and dressed classes. In Tamworths, however, there is a reversal of the decision, the first-prize pair in the block test winning no prize on foot; the second prize pair winning third; and the third-prize pair second, in these two classes respectively. In the grade classes, the first-prize pair in the block test was given fourth place in the ring. It might be mentioned that this same pair won the sweepstakes in the block test over all breeds.

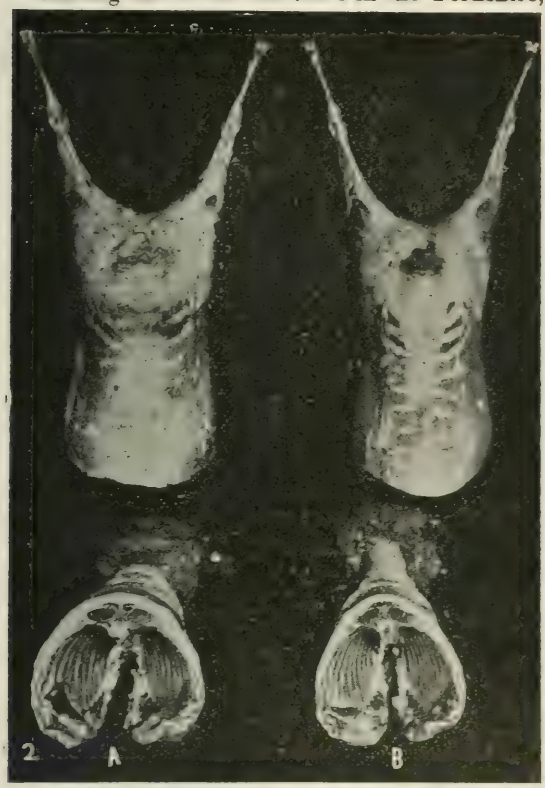

Figure 6.—Of these two sheep, B is too thin to compare favorably with A. A is not too fat, and the fat and lean are fairly well mixed.

Sheep Classes. Here, again, the decisions harmonize fairly well. It is impossible in a number of cases to make any comparison on account of the fact that the animals were sometimes entered for the block test unnamed; and it was therefore impossible in these cases to identify them. Where comparisons were possible, there are in the yearling classes only two reversals. In the Shropshire, the first-prize animal in the block test received no place on foot; and the second received third and the third second. In the Southdowns, the first and second have their places reversed in the two classes. The same is true of the Lincoln lamb class.

The accompanying tables set forth the comparisons of these decisions, so far as comparisons are possible. Those who wish to study out the matter in detail may do so by referring to these tables:

Breed.	Tamworth.			Yorkshire.					Berkshire.			Essex.			Grade.		
Prize in block test	1	2	3	1	2	3	4	5	1	2	....	1	2	....	1	2	3
Prize in ring	...	3	2	1	2	.	4	3	2	4	....	1	2	....	4	1	....

Breeds.	Cotswold.			Dorset.			Leicester.			Lincoln.			Oxford.			Shropshire.			Southdown.			Grade.		
Prize in block test	1	2	..	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	..
Prize in ring, 1 year, under 2	....	2	3	..	1	2	3	..	..	..	..	..	1	2	..	..	3	2	2	1	0	1	5	..
Prize in ring, under 1 year	..	..	..	..	..	..	..	1	2	..	2	1	..	..	..	..	..	..	0	2	0	..	..	..

There has come to hand a report from the Davies Co. on the individual mutton carcases. This report in detail is perhaps of less interest to the general public than to the

exhibitors. If any exhibitor wishes to obtain a report on his own exhibit, he may do so by applying to the writer.

The following is a letter relating to the shipment of bacon from the Provincial Winter Fair to the Davies Packing Company:

Covering the 62 dressed hogs shipped to us from the Guelph Winter Fair, we find a marked improvement in the general character of type of these hogs as compared with any previous shipment received by us from our winter exhibit. There was plainly an effort on the part of the breeders to produce a well developed lengthy hog, having the particular characteristics required for the production of Wiltshire sides of bacon. We think that the irritation of breeders of the type of hog used in the United States—Poland China, Chester White and Douroc Jerseys—because they were refused prizes by the judges in the Wiltshire bacon classes, arises from a misapprehension which should be corrected.

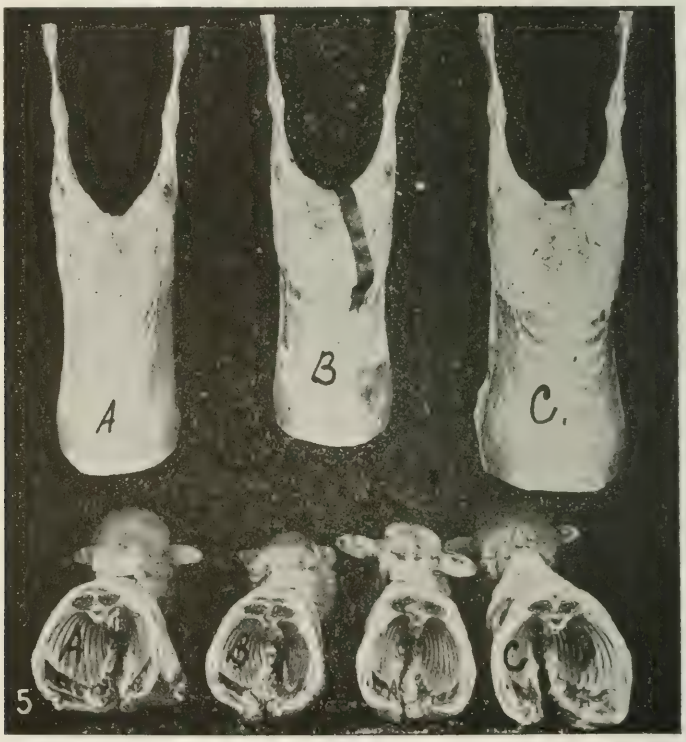

FIGURE 7.—A choice lot of lambs. Any one of them apparently worthy of a prize. The decision was given in favor of B on account of the better mixture of fat and lean over the ribs. A is a little too thin.

There were several of these hogs in the parcel shipped to us which were reasonably good of the kind, but they represent a type of hogs which are not suitable for the manufacture of best Wiltshire sides. In saying this we are not reflecting upon the excellency of these breeds for the purpose for which they are adapted. Their prime qualities are developed in the production of a stout, well-finished fat hog, where lard is an important part of the product, and the development of a fat side a necessity. Therefore, it is entirely erroneous for breeders of these hogs to feel that they are being discriminated against in any improper way.

If Canada, at some later date, chooses to raise in competition with the Western States hogs abounding in fat and heavier in weight, these breeds will be pre-eminently satisfactory, and will win in any competition against the Wiltshire type of hog, which is now so much in favor. We venture to make these remarks because we feel assured that if the facts of the case are understood, the irritation will be found to be entirely misplaced.

We believe Canada will continue to breed and feed hogs suitable for Wiltshire sides. The type of hog required for this purpose has been so often described that we have

no right to trespass upon your space to repeat what is needed. It is right, however, for us to say that in the parcel received by us, above referred to, the "Yorkshires," "Tamworths," and "Grades" were altogether superior to the others, and if we are to steadily improve the character of the Wiltshire sides, shipped from Canada, we must steadily increase the percentage of the hogs marketed of these desirable types. It is not to be understood that none of the less favorable types will make Wiltshire sides, but it is to be understood that the whole tendency of these breeds is to produce an article, if the hog is moderately well-finished, unsuitable for Wiltshire trade, and, inasmuch as the character of our Wiltshire sides on the English market is determined by the average character of the whole shipments, it is plain that every hog put into a Wiltshire side which does not produce the best article, injuriously affects the average of the whole.

J. W. FLAVELLE.

FIGURE 8.—A prize sheep carcass. Won the sweepstakes over all breeds. The live animal and the dressed carcass won at Chicago and at Guelph in December $127 in prize money.

The block test is undoubtedly a potent factor in harmonizing the judgments on classes before and after slaughtering. There is, this year, less discrepancy in this respect than last year. The appointment of the same judges for live and dressed classes, and requiring these judges to justify their decisions before the public in the lecture room, will certainly lead to a more careful and discriminating study of those indications in the live animal that point to the most desirable quality of meat in the carcass. There is a decided demand for this harmony of judgment; and, at the meetings held at the recent show, scant consideration was given to "breeders' ideals" that interfered with the demands of the consumer.

THE BREEDING AND FEEDING OF PRIZE WINNERS AT THE ONTARIO PROVINCIAL WINTER FAIR, 1900.

Ten per cent. was added to the prizes won by any exhibitor in any class upon furnishing the Secretary within 14 days of the close of the exhibition, with a detailed statement setting forth how his animal or animals were bred, how and what fed, and how cared for from the time of birth to the date of the Show, and as far as possible the cost of the feed consumed. The exhibitor furnishing the most valuable information in the cattle department received an additional prize of five dollars. A similar prize of five dollars was given in each of the other departments, viz., sheep, swine, and dressed poultry. In the cattle department the prize was awarded to D. McCrae, Guelph; in the sheep department, John Campbell, Woodville; in the swine department, And. Elliot, Galt, and in the poultry department to J. Poole, Lambeth.

The judges were Dr. Jas. Mills, Guelph, Prof. G. E. Day, Guelph, and G. C. Creelman, Toronto.

Following are the reports :

CATTLE.

By D. McCrae, Guelph.

The Galloways shown at the Provincial Winter Fair, Guelph, in December, 1900, were all Canadian bred, and with one exception, were all from animals bred and fed in Canada. The six Galloways shown were sired by four different bulls, but were only of two lines of breeding. "Canadian Borderer" 5945, and his grandson "Balmaghie" 14597 represented the "Scottish Borderer" 669, and "Black Prince" 549, of Drumlanrig 549 stock, "College Boy" 10395 bred at the Ontario Agricultural College, and his son "Ozar" 12807, trace directly to the "Harden" 1142 branch of the Galloways. Of those, "Canadian Borderer" has been most prominent as a prize winner. Short in the leg, with deep and well sprung ribs, he showed some good beef points. The other type, long bodied, thick hearted, with straight lines above and below showed more daylight under than the Borderer type. On the dam's side, the Semiramis family has been most celebrated in Galloway animals ; with fine silky hair and soft hide, they are good handlers and have got well fleshed backs, with a tendency of fine bone and prominent square quarters. The back bones are a trifle prominent for the best Galloway type. Semiramis 28th, one of the family showed in the carcass test, had good rich marbled meat ; the other cow shown, a three-year old in November, traces back to the Scotch Border herds. She is Adela of Wentworth, out of imported Adela 3rd of Drumlanrig, and is a very good beef type,—broad back, long quarter, well rounded, with good head and soft hide. She carries some of the favorite blood from the herd of the Duke of Buccleuch.

How Bred. All the animals shown were fall calves, and the dates of their birth were from the middle of September till January. Fall calves are preferred because they can get more care and attention during the winter months than in the spring and summer, and also because when the grass comes and the herd goes out to pasture they are strong and thrifty and able to take care of themselves.

How Fed. The cows are fed soft, succulent food with a daily allowance of roots and grain, and milk well, making good strong calves. The calves suckle twice a day at milking time,—morning and night. They have pens where they run loose, and are feed a ration of chopped oats, bran and oil-cake occasionally. They have also clover hay supplied, and very soon they learn to nibble at it. They have also water and salt before them all the time. Large, well lighted pens are the best, where they can have exercise all the time.

Pasturing Early spring pasturing is not encouraged. The stock are better inside until there is a full bite in the pastures. If the grazing ground has been free from stock after September it will give a return much earlier in the spring than land that has been eaten bare in the late fall. Old grass is preferred to newly sown fields. Blue-grass and red-top are better than timothy, and are much the better for a mixture of clover, white alsike or red.

The pasture fields give best results where they have running water convenient, and abundance of shade. With spring pasture, nothing else is given, but by the latter part of July and the beginning of August, fields may become dry and somewhat bare, and supplemented food is given. Oats, peas and catches sown for a soiling crop are used, and sometimes winter rye, cut green and fed either on the pasture, or if more convenient in the stables. Later, cut cornstalks are available, or Sorghum till September, after which white turnips, tops and all, are lifted and taken to the pasture fields where they are fed on the grass. If rape is available the young stock will do well on it, but care must be exercised in the pasturing of rape. Stock should never be allowed on it while hungry, and should always have a grass field to run in if it is convenient.

Winter Feeding. Cattle are better to be housed at night when the cold fall rains come on. Cold snowy rains are trying on young stock in exposed fields, and they are much better to be safely housed during such storms The calves are put by themselves in loose boxes, if these are available, if not, then tied as the older cattle are, with chains around the neck, and running in an iron rod at the side of the stalls. It is much better to feed cattle loose, where the room is available. They do well in small batches. The calves require extra food and extra care the first winter. Ours get a bite of good clover hay as an extra ration.

What Fed. Corn is the staple winter feed for all the stock. To have it shocked near the barn is found to be better than leaving it in the field. If there is shed room, it is better stood on end under cover. It is taken to the barn as needed, and run through the cutting box and mixed (about equal parts) with cut straw. First cut wheat straw and chaff,—pea straw has also been occasionally used for a change,—cut rye hay also, and later cut oat straw harvested on the green side. Even cut oat sheaves do very well when available. When the cured corn has been used the silo is opened, and silage is mixed with the cut straw in the same proportion. Early in the year the dried corn seems the best, but later the silage is preferable and is more easily handled. This mixture is fed night and morning with a grain ration sprinkled upon it. Chopped oats and bran are the usual grains. For heavy feeding pea meal and oil-cake are added, and this past year brewers' grains have also been used for the milking cows and young stock. The grain ration is added in the feed box, and varies with the needs and appetite of the animal being fed. This is given twice a day—night and morning. The animals all go out to an adjoining yard for water once a day and come back to a feed of roots,—sliced for those changing teeth, but fed whole to all other stock. Yellow turnips are fed first in the fall, followed by Swedes, which are, if abundant, fed in quantity, if not, then in such a way as to have them last until March when mangels are fed until the spring grass comes.

Fat Stock Feeding. The same routine is followed with stock specially fitted for show purposes, as fat stock; but they are not placed in pasture for any length of time in summer, and in hot summer days are better kept cool and dark in the stables during the day and put out at night. Heat and flies are very trying to very fat stock, and they have to be kept quiet and comfortable to get the best results. They have to be carefully watched and fed with judgment and skill to get the front mark in the prize lists of our Canadian Shows.

By James Bowman, Guelph.

Elm Park Bell 3rd, Elm Park Lad and Kyma 10th when calves sucked their dams and were fed oat chop and mangels in winter, and green feed instead of mangels in summer. They were weaned at from six to eight or ten months, and in fall ran on rape. The first winter they got roots, meal (mostly oat chop), and hay. They were kept in during the day in the hot weather while flies were bad, and let out at night. All except the steer ran on rape this fall. The steer was fed meal, pulped roots, and chaff mixed with a little oil-cake, and what hay he would eat. Lass of Tweedhill was not raised by me. I bought her when she was three years old, and fed her very little meal last winter as I expected she would breed. As she turned out barren I fed her meal and hay with a little green feed in summer, and pulped roots, meal (peas, oats and barley mixed), and chaff with a little oil-cake until the show. She was let out each day for exercise and to get water. The Grade cow was sired by an Angus bull, and out of a Durham Grade cow. She was raised on skim milk, and was fed meal the same as pure bred calves, and had a run on rape in the fall. She was fed chaff or straw with a few roots after the first winter. She was milked up to last spring; then we started to feed her meal and hay and a very little green feed during the summer. This fall she has been fed on meal (peas, oats and barley) with pulped roots and chaff—mixed a feed ahead. She was fed no oil-cake as it did not agree with her. She would eat about fifteen pounds of meal per day.

By S. Young, Binkham.

Springside Beauty.—It is impossible to give an exact daily or weekly ration, as it was so varied according to age, but I will give the kind of food and the average quantity fed. She was calved February 2nd, 1900; sire, Campbell of Tweedhill, 28216; dam, Colleen of Springside, 555 She sucked her dam twice each day for nine months. She commenced at two weeks of age to take a little pulped turnips, whole oats and bran mixed with a handful of fresh hay, and continued this until the 20th of May when she was put out to grass where she had access to fresh spring water. About August 20th we commenced to feed her one pound of bran, one and a half pounds of whole oats, and what green corn she would eat. This was fed for one month. On September 20th pulped turnips were added, whole oats were taken away and one and one-half pounds of meal (equal parts oats, barley and peas) were substituted. This was continued up to the first of November, when she was weaned and received five pounds of ensilage with an occasional feed of boiled barley and oats.

It is not the amount nor the variety of food that alone is necessary to make a success of feeding There must be combined with the feed regularity in feeding and good care. In this case it was principally given by a twelve-year-old boy.

By W. M. & J. C. Smith.

The Ayrshire heifers shown by us at the Provincial Winter Fair were bred as follows: The first prize heifer, Gurta Osborne, 9066, was calved September 20th, 1897, and was sired by Surprise of Burnside, 2007. His sire was Imported Glencairn 3rd, and dam, Imported Nellie Osborne, first prize cow at the World's Fair, Chicago. Her dam was Gurta 18th, 1959, grandsire, Rob Roy of Oxford, 300; Grand dam, Gurta 11th, the second prize cow at the World's Fair. Angeline, 9068, was calved October 25th, 1897, and was sired by Surprise of Burnside, 2007; her dam was Pauline Johnson, sired by Leonard Meadowside, the first prize bull calf at the World's fair. They were both bred and owned by exhibitors. They were fed the milk from their mothers for two weeks and then part skimmed milk for a week or ten days; then skimmed milk for about six months, and when they would eat, they were fed a little hay and bran or oat chop, and were kept in the stable all fall and winter. They had some roots pulped fine to eat the first winter. As soon as the grass in the spring was fit for pasture, they were turned out for the summer, and the next winter they were fed straw with a little roots and some hay and corn stalks, and then turned out again in the spring to pasture. The next winter they were fed mostly straw with a little corn fodder.

In the spring of 1900 they were turned out to pasture again, and after harvest, when the corn fodder was large enough to feed, they were fed a little green corn in the field, and some dry corn and a little bran and oat chop in the stable.

At Guelph they were fed mostly ensilage, with a little bran and some other chop consisting of oats, peas, and ground oil-cake. Gurta Osborne consumed food valued at 80c, and Angeline, 79c, in the seven days and eight hours. Angeline dropped her calf August 16th, 1900, and Gurta Osborne, September 2nd, 1900.

SHEEP.

By John Campbell, Woodville, Ont.

This year our exhibit was made up of twelve Shropshires and eight grades. The latter were all sired by Shropshire rams, sons of our well known imported sires, Newton Lord and Fair Star Dreamer. The Shropshires won five first prizes, four seconds and two thirds, including first and second for pens of three ram lambs, and first also for pens of three ewe lambs. The grades won six firsts and two seconds. A pen of three wether lambs contributed one of the firsts and one of the yearlings furnished the Grand Sweepstake Carcass.

How Bred.—Shropshire ewe lambs, winners of first and second in section one, and first in pen of three, section four, were sired by Newton Lord, and the dams were imported ewes bred by Mansell, Mills, and Nevett. Yearling wether, The Model, 133210, first prize sheep in section two, was sired by The Best Type, 88775, a son of Newton Lord. Wether's dam was imported from Nevett's flock. The second prize yearling wether Hopeful, 134529, was bred by Mr. James Bole, Woodville, Ont. Sire, Tantalizer, 59972, was bred at Fairview; dam, a Canadian-bred Shropshire, sired by Newton Lord. Our third prize wether lamb, section three, was sired by Newton Lord; dam, imported Mansell ewe.

The first prize pen of three ram lambs were, The Magistrate 2nd, sire, The Paragon, 112907, a well known son of Newton Lord's, with a good show yard record; dam, a home-bred ewe; The Baron, by Newton Lord and dam imported Mills ewe; and The Parson, by Fair Star Dreamer out of a Newton Lord ewe.

The second prize pen of three ram lambs were all sired by The Paragon, a ram which was turned into the flock in 1899 after a long showing season to take up any ewes breaking former service. No selection of ewes was made, yet of eight lambs sired by him, four were in the first and second prize pens.

Grades.—In section one our first prize yearling ewe was sired by Newton Lord and the dam was a high grade Shropshire, four top crosses on a Leicester grade foundation. The winning ewe lamb in section five is a full sister, and so was the yearling first prize

grade ewe at London in 1899, which also won the sweepstake n the c a s. Our first prize yearling wether in section two won second last year. His dam was a half breed Shropshire, the other half being Leicester grade. The wether's sire was Fairview Sort, 99519, a son of Newton Lord's and Campbell's 508, 56994, a first premium ewe at Madison Square Garden Show, New York City. This wether also won first in his class, dressed carcass, and Silver Medal, Grand Sweepstake, for best sheep carcass any breed.

The three grade wether lambs, winners of the first premuim in pen, section three, were sired by Fairview Dreamer and Major, rams bred at Fairview, sired by Fair Star Dreamer and Newton Lord. Their dams were good grade Leicesters and Cotswolds. It may be of interest to note the fact that of all the first prize winners, numbering nine individual pure-breds and six grades, with two exceptions, they had Newton Lord, the Champion Shropshire ram at the World's Fair, for sire or grandsire.

How Fed.—During the first months of their lives the lambs depended on the dams. When they began to join their mothers at the feed trough, the creep was set up, behind which a small supply of oats and bran, sprinkled over finely pulped turnips was fed. The trough as cleaned out daily before a fresh supply was put in. A sunny yard provided for exercise while the flock was confined in early spring, was found beneficial. The dams were fed liberally with clover hay, pulped turnips mixed with crushed oats and bran. Mangels replaced the turnips after April 1st. When turned to pasture in early May, the grass being abundant but not rank, very little trough feed was eaten for about a month. Roots gave out before that time, so a liberal feed behind the creeps was supplied morning and evening. The result was a steady growth of bone and muscle. They were weaned in July and were turned on rape, morning and evening, had a run on grass and were fed grain as formerly. In August, barn feeding during the heat of noonday was commenced. Tares sown at different periods, at intervals of two weeks, furnished a much relished noon feed. In early October turnips are ready for use, when they were fed in the barn twice daily. A run on rape morning and evening, a small feed of grain mixture to which a sixth of split pease was added three times a day, in half pound feeds, with clover hay, was the mode of feeding until show time. At times a little variation in grain by adding ten per cent of barley, or five per cent of ground flax seed was apparently relished.

The grade lambs were bought from neighbors who give no special care to their flocks. All spring and summer they ran by the roadside, and so far as known had nothing to eat except what the wayside furnished.

That part of our exhibit over a year old, were the lambs we showed last year and were cared for as described, till show time in 1899 After coming from London they were carried through the winter on unthrashed peas, fed in the morning, cut roots—a liberal feed at noon, clover hay at five, and half a pound each of grain mixture at night. The first of May they turned out to pasture, with a little grain twice a day. About the middle of June they were turned on rape, and had plenty of grass and tares fed in the barn at noon, with very little grain fora couple of months. In August, and after, they were handled and fed in the same manner as the lambs, already described, until started Winter Shows.

We endeavor to have fresh water and plenty of salt constantly within reach of every for the sheep

Cost of Feed Consumed —As that if again asked for this year, I wish it were possible for me to attempt giving it. I was rather well pleased to find my impressions of last year silently endorsed by the fact of only one exhibitor attempting to give a detailed statment of cost, and that one was discredited by the judges of our contributions. The cost of feeding the winning animal is undoubtedly greater than that of growing the ordinary butchers' beast, at similar ages. In the one case feeding for profit is or should be the feeders' aim. In the other, feeding to win at all costs is the object in view, and he who waits to count the cost, will surely be left behind in the race.

We shall, therefore, with much interest read the statements which may be given by other successful exhibitors at Guelph this year, but for my part I will not venture on giving, what at least would probably prove but misleading estimates of the cost of production.

By H. N. Gibson, Delaware.

The nine lambs shown successfully by us at the Provincial Winter Fair were Shropshires and Shropshire Grades. The six Shropshire lambs were by imported rams, and, excepting one, out of ewes of our own breeding. The Grades were high Grade Shropshires and had four straight Shropshire crosses on ewes of the long wool type. They showed the prepotency of the Shropshire very strongly. These lambs were dropped in April, and were taught to eat a little grain before leaving the sheds to go on grass. Each day when not too cold, they were turned on the young grass and brought in after about an hour's run. In the early part of May their mothers were shorn, and the whole lot run through the dipping vat. The grain was then stopped as grass was plentiful and the little chaps did not care for grain. They ran with their mothers until July 15th, when they were weaned and turned on a field of rape and clover aftermath for an hour or so at first, until they became accustomed to it, when they remained on it. They were then started on a little grain ration of oats and bran mixed, and when they had become used to it and ate it with a relish, the grain was increased until each lamb was eating a pint a day. This was continued until September 1st, when the lambs intended for show were separated from the field lot, housed during the day, and were put on a little field of rape at night. The grain was gradually increased, and by the 1st of October they were eating one and one-half pints each daily. About October 1st they were housed nights and ran out during the day, being fed before going out and after coming in at night In addition to the oats and bran were added peas, barley, corn and malt, equal parts of each by weight. The grain was fed first in the morning and was followed by cabbage. They had all the cabbage, white turnips, and clover they could eat, in addition to the rape and grain.

At the time of the show at Chicago, they were eating a quart per head of the above named mixture, twice daily. The cost I do not know, and consider that one should not count the cost when fitting for show. The idea is to spare nothing to promote thrift and flesh. Lambs fed thus have in the past five years been beaten but once at the Fat Stock Shows of United States and Canada; also have won on the block for two years in succession.

By R. H. Harding, Thorndale.

The Dorsets exhibited by me at the Provincial Winter Fair of 1900, were all Canadian bred, and from Canadian bred sires and dams, excepting the ewe lambs. The yearling wethers were in fairly good condition at the time of the Winter Fair held at London, December, 1899, where they were shown as lambs. After the Fair they ran with the breeding ewes until about October 15th when they were put on a small plot of rape and a timothy meadow, where they were fed, along with some ewe lambs, about one and one-half pounds of grain per day, a mixture of oats, peas, bran, ground flax and a little herbageum, (principally oats). They were between twenty and twenty-one months old when they were killed; weighed one hundred and seventy-one and one hundred and seventy-five pounds alive, and dressed one hundred and thirteen and one hundred and fourteen pounds respectively. As they were judged alive late in the evening and killed early next morning, they were killed with full stomachs, which makes the percentage of waste greater than it would have been. One of these wethers secured the championship at the International Live Stock Exposition at Chicago. The two wether lambs that were shown and dressed at Guelph were lambed in May. They only received grain for about one month, commencing light and increasing probably to one and one-half pounds each per day. The grain consisted of the mixture above mentioned. They were about seven months old when killed; weighed ninety-five and ninety-nine pounds alive, and dressed fifty-seven and sixty-three pounds respectively.

The Grade ewe lamb that secured second prize when shown alive in a class of eight or nine, was about ten months old; weighed alive one hundred and sixteen pounds and dressed seventy-four pounds. She was sired by a pure bred Shropshire ram and from a pure bred Dorset ewe. The mate secured third prize in the dressed lamb section at the Chicago International Exhibition in a very strong class. They received no special care since they had been turned out to grass in the spring until about four weeks before the show, when they were taken in and fed the same as the wether lambs mentioned above.

In comparing the shrinkage of the above with others having a smaller percentage of apparent waste, it might be well to mention that those carcasses were composed almost

altogether of marketable meat, while the very fat carcasses will show a smaller amount of waste between the live and dressed weight, but a large portion of the fat has to be trimmed off before it can be sold

The two ewe lambs that I showed were lambed in February and March, and were sired by imported rams. They were fed a small grain ration continuously, from about June 15th, commencing with about one-half pound per head per day, and increased to one and one-half pounds per day for the last two months. Jean, 1520, the winner of Sweepstakes, was one of the bunch that I showed at Winnipeg and Brandon. I mention this simply to show that she has had something to do besides put on flesh. When she arrived home after a five weeks' outing (most of the time on a freight train) during the months of July and August, she was pretty thin; however, with Lady, 1685, as her mate, they secured 2nd prize at the London Fair in September in a strong class, winning over an imported pair. That was the only time they have been shown as a pair.

As to the cost of feeding, it is almost impossible to do more than jump at a conclusion, so I will only attempt to give an account of the extra costs. By this, I mean what was fed over and above what is necessary to keep them in good growing condition. The yearling wethers consumed from ninety to one hundred pounds of grain each during the last two months of fitting The cost would be about eighty-five cents per head for extra feed. The wether lamb and Grade ewe lamb cost me about fifty cents per head for grain during the finishing period. The ewe lambs were fed grain a much longer time than the others. They got about one pound of grain each per day from the middle of June until September, and about one and one-half pounds per day for the remainder of the term. This would make the extra cost on them about two dollars each. Some may wonder why they cost so much more than the wethers. This is simply because they were kept knocking about at Shows, and were much harder to keep in good condition on that account.

By James Bowman, Guelph.

The Suffolk wether that took second prize alive, and also in the dressed carcass competition, was bought at the London Show last year, and after that was fed about one pint of grain per day, about a gallon of roots in two feeds and as much hay as he would eat up clean; also pea straw. In summer he ran on pastures getting no other feed. In October and part of November he was put on rape, and a short time before the Show was fed grain (mostly oats, a little peas, and barley), pulped turnips and hay.

By John Park and Sons, Burgessville.

Our shearling wethers that won the dressed carcass prize, were bred from the imported ram, Hopeful, 16182, and home bred registered Cotswold ewes. They were dropped the last week in April, and the ewes were kept in until the 15th of May, and were fed in the following manner. Night and morning the ewes were fed clover hay, and at noon, threshed pea straw. They were also fed at night and morning, a grain ration, consisting of one part peas, two parts oats and three parts bran. In addition to this they were fed a bran mash at noon, with the water slightly warmed, and were also given at noon a liberal feed of turnips. They were given a run in a yard on nice days, as we consider exercise very essential for growth in young stock of any kind.

We turned them out to pasture on the 15th of May; they were first put on timothy sod and allowed to run there for one month. They were then kept on clover until the first of August. The lambs were then weaned and put in a field of rape. After they had been on the rape for two weeks they were allowed to run in a clover pasture or in the rape which ever they wished. We find that lambs do better when they have liberty to run in a clover field, and not be entirely confined to the rape. They were fed no grain until the middle of November. During last winter they were fed pea straw and roots night and morning, and at noon, clover hay with grain ration consisting of two parts oats, two parts bran and one part peas,—about one pint to each lamb. This manner of feading was continued throughout the whole winter. In the summer they had free access to water, and during the winter they were tried with water once a day. Last spring they were again turned out about the 15th of May, and were kept in good clover pasture until August, when they were put in the rape for six weeks. They were then taken to the pens and fed grain three times a day; kept in during the day and turned out on timothy sod at night.

Our ewe lambs and wether lambs were fed in very much the same manner as the shearling wethers were during the summer of 1899, excepting that we started to grain feed them about six weeks sooner.

By John Jackson, Abingdon.

The eight sheep we exhibited at the Provincial Winter Fair, Guelph, were all pure bred Southdowns. The two shearling wethers were two of the three we showed as lambs last year at London. After the show they were turned in with a bunch of ewe lambs, and fed with pea straw and clover hay, supplemented with about two pounds of roots (mangels) and one half pound of mixed food,—equal parts of oats and bran with a small quantity of nutted oil-cake. This was continued until about the first of May, when they were gradually changed to pasture with no other feed. After harvest they had the run of the oat stubble where from one to one and a half pounds of rape seed was sown along with the oats. This way of growing rape we think the cheapest food that is grown on the farm.

After the 25th of October they were put inside nights and fed a little cut rape, with an average of from one to one and a quarter pounds of the mixed food before mentioned. This was continued up to the time of the show (forty-five days), when they were scarcely forward enough for the live ring and rather too fat for the dressed carcass class.

The three ewe lambs awarded first and second single, and first for pen of three were our own breeding, and were dropped about the middle of March. These got what their dams furnished and the run of the pasture, which a part of the time was good and part of the time very much dried up. The first of August they were weaned and kept inside during the heat of the day, with a run on the pasture at night. They were fed green vetches and the mixed grain food, gradually increasing up to one pound per day till the latter part of August, when they started the fall shows, beginning with Toronto and winning first prize there. They were knocked about in the show rings until the close of the local fairs. They then had a run of a couple of weeks on the rape pasture, which brought them up to the 25th of October.

The three wether lambs awarded second and third single and second for pen of three, —also our own breeding—were dropped about March 30th, and castrated when about six weeks old, (two weeks is a better age). These lambs ran on the pasture and rape without grain till October 25th. They were weaned about the middle of August. From this time up to the Winter fair, all were fed together as above stated, getting a feed of cut rape with from one to one and a quarter pounds of grain food, and a run on a grass paddock during the day. This gave plenty of exercise. I would have preferred a few roots for food, but our roots being an entire failure this year, they got none. Cost of grain feed, fifty cents each.

The two ripest wether lambs were in prime condition for the live class ring. The other, not so forward, we entered in the dressed carcass class where he was awarded second prize. We also slaughtered the leanest shearling wether. He was too fat to win. The other brought five cents per pound, live weight, for the Hamilton Xmas market.

As to the cost of production, we find the ewe lambs had consumed about one hundred and twenty-five pounds of the grain mixture, $1.20, and made an average gain of forty pounds at five cents per pound, $2, notwithstanding that they were knocking about at the fall fairs. The wether lambs were fed a shorter time—forty-five days—and gained thirty pounds each with only fifty pounds of grain, costing fifty cents. Thirty pounds gain at five cents per pound, $1 50. The conclusions are that about six weeks is long enough to feed. The food should be of a bone and muscle forming kind, rather than too much fat. From experience we find oats and bran, with a little roots, a first class food, with pea straw and clover hay for roughage.

Many important lessons are taught from the results brought out at this great winter fair. To my mind it does not follow that there is something wrong because the awards in the dressed carcass class does not usually follow the awards made in the live class ring. Competition in the live class teaches what type of animal to breed. The dressed carcass test shows how to feed and how not to over-feed. The right type of a sheep is easily overdone, while the poor, lank, flat-ribbed animal takes his feeder all his time and a good deal too much food to get him fitted.

SWINE.

By A. Elliott & Son, Galt.

Great care was exercised in choosing those pigs from the best and most healthy sows in the herd. The products of two litters were chosen and placed in pens of six each, paying special attention to having those in each pen as near a size as possible. At this time they were fed shorts and barley meal, half and half, with all the skimmilk—fresh from the cream separator—they could drink. They were brought along nicely, not fast, but in good growing condition until they were about three months old, when the barley meal was increased slightly, with the addition of a small quantity of corn. This formed their ration until they were about four and a half months old when it was dropped, and a ration made up of peas (unground) soaked in skimmed milked for twelve hours before feeding, gradually substituted.

Before this period the pigs were only in good growing condition, but from this time on they made very rapid progress, gaining about twenty pounds in twelve days. This ration formed their food until the show. Throughout the whole period the hogs had no more exercise than the space their pens allowed. It is my opinion that they would have scored higher had they not been quite so fat. Probably four week feeding with peas would have given a better grade of pork.

It may be interesting to note that they were killed slightly soft, due no doubt to the rather forced feeding they received the last six weeks.

With regard to the Grades shown by us, they were bred from a three-quarter Yorkshire sow and a Tamworth boar. They were farrowed on May 20th, and allowed to run with the sow in pasture until they were two months old, when they were weaned and placed in a small clover lot where they were fed all the crushed oats and shorts they could eat. This formed their ration until well on in the fall, when they were removed and allowed to pasture on the fall wheat, receiving in addition, chopped peas and oats. Two weeks before the Show they were taken off the wheat pasture and shut in, receiving the same grain ration as previously. They received no milk at all, and killed out well.

By N. M. Blain, St. George.

The sow, Thrifty May, 1881, farrowed October 10th, 1899, was bred by Colwill Bros., and purchased by me after the Toronto Fair; therefore I know nothing about her feeding before that time. Since then, her food has chiefly been a mixture of barley, shorts, and a small quantity of bran. She farrowed a litter of seven pigs on October 10th, 1900, being exactly one year old. The pigs were allowed to run with her for five weeks and were then weaned. At that time the sow weighed 385 pound. She was fed lightly for one week until the milk was off, and then had all she could eat. She entered the ring at Guelph weighing 430 pounds, where she won first prize as sow under fifteen months and, sweepstakes.

The other hogs exhibited were Leading Lady, 2016, Lovely Lass 2017, and Si, a little brother to these sows, farrowed March 15; dam Della, 780; sire, Advance, 610. These were three of a litter of nine. They were fed very lightly after weaning,—just a drink of thin slop night and morning, and were never confined. They had the run of pasture and stubble until September 22nd, and then I decided to exhibit these three at the Winter Fair. Their average weight at that time was one hundred and forty pounds. They were put in a pen by themselves, and fed all they would eat up clean of barley, chop and shorts mixed, soaked one feed ahead. Their average weight on December 8th, was two hundred and eighty-five pounds, making a gain of two and one-sixth pounds per day.

Fancy, 2015, Rosy O'Grady, 2019, and Jim were farrowed June 4th; dam, Trilby, 580, sire, King George, 516. The two sows and barrow exhibited under six months winning first and second on sows, and third on barrow. After weaning they were fed shorts, bran and a little skimmed milk twice a day. As they grew older the food was increased and strengthened by the addition of mixed chop and a little corn. They were allowed exercise every day in a yard, and had what green food they would eat,—green corn and white turnips. I would have preferred mangels but the mangel crop was a failure.

When they were five months and thirteen days old, their average weight was one hundred and ninety-nine pounds.

The bacon hogs shown and slaughtered were not specially fitted for that purpose. The ones I fitted became too heavy and had to be turned off. They were fed very much the same as the six months' lot, with the exception that they received no milk. This has reference to the fifth prize pair. The first prize pair were not slaughtered, but were shown in the bacon classes, and then under six months. The Grade hogs were all purchased sometime before the Fair, and therefore I could give no satisfactory account of their feeding.

As to the cost of production, I am unable to give exact figures. While I am satisfied that I can produce for $3.50 per hundred weight on an average, in the case of show stuff a person is inclined to force them too fast and raise the cost of production; but from knowing the amount of food consumed, I am satisfied that they were produced at less than four cents per pound.

By W. M. and J. C. Smith, Fairfield Plains

The Poland China pigs shown by us at the Provincial Winter Fair, 1900, were all bred and raised by ourselves with the exception of one bred by Harry Jones of Mount Elgin, which was bought by us when about four months old. The pigs were allowed to suckle their mother until they were about two months old. When they were old enough to take care of themselves and the weather was not too cold, they were allowed to run. As soon as they would eat they were fed a mixture of shorts and chopped oats, corn and barley, and what swill and skimmilk there was left after feeding the calves. They ran in the orchard during September and October, and had all the fallen apples they could eat. In November they had some roots,—turnips and mangels—with whole corn and shorts and chop-stuff. In this way there should be a good profit in raising pigs at five cents a pound live weight, weighing from one hundred and seventy-five to two hundred pounds at from five to seven months old.

MANUFACTURERS GIVE SPECIAL PRIZES.

The list of special prizes offered this year by manufacturing and other firms was very large, as the following will show: J. Bibby & Sons, 10 Bay street, Toronto, 10 cwt. Cream Equivalent, value $35; Thom's Implement Works, Watford, Corn Scuffler, value $10; Massey-Harris Co., Limited, Toronto, General Purpose Plow, value $15, and a Cylinder Root Pulper, value $15; S. Vessot & Co., Joliette, Que,, Grain Grinder, value $40; Waggoner Ladder Co., London, Folding Lawn Swing, value $10, 30 ft. Extension Ladder and 8 ft. Extension Step Ladder, value 12.50; Chicago Flixible Shaft Co.. Chicago, Ill., Sheep Shearing Machine, value $15; J. Fleury's Sons, Aurora, a plow; Toronto Salt Works; Toronto, one ton Rock Salt; West Chemical Co, Toronto, ten gallons West Chemical Fluid; Traders' Bank, Guelph, A. F. H. Jones, Manager, Silver Medal; Wilkinson Plow Co., Toronto, a Plow; Spramotor Co., London, Spramotor, value $10, and National Cream Separator, value $75; Windsor Salt Co., Windsor, 10 barrels of Salt; Winnipeg Heater Co., Toronto, Winnipeg Heater, value $8; Ingersoll Packing Co., Ingersoll, $50; Collingwood Meat Co., Limited, Collingwood, $50; Bank of Commerce, Guelph, J. M. Duff, Manager, Silver Medal, value $10; Rippley Hardware Co., Grafton, Ill., Reliable Feed Cooker, value $45; Hon. Sidney Fisher, Dominion Minister of Agriculture, Ottawa, $50; Forest City Business & Shorthand College, London, Silver Cup, valve $50.

LIST OF PRIZE WINNERS.

CATTLE.

Shorthorns.

Steers, two years and under three, one entry.

1. J. Fried & Sons, Roseville, Wild Bill. Sire, Lord Willison, 24315; dam, Sunflower, 19205.

Steers, one year and under two, two entries.

1. Israel Groff, Alma, Crimson Robe. Sire, Golden Robe, 20396; dam, Crimson Gem.
2. Peter Stewart, Everton, Hermit Sire, McTurk, 213242; dam, Rose Braniff, 13038.

Cow or heifer, three years and over, seven entries.

1. W. J. Biggins, Clinton, Matchless of Elmhurst 18th, 31394. Sire, Royal Don, 17105; dam, Matchless of Elmhurst, 18570.
2. Daniel Talbot, Everton, Dorothy Fox, 30939. Sire, War Eagle, 13015; dam, Minerva, 20931.
3. John Campbell, Woodville, Crimson Maid, 25032. Sire, Recruiter, 15953; dam, Stonefield Maid, 3rd, 17548.

Highly Commended, H. K. Fairbairn, Thedford, Maid of the Mist, 15830. Sire, Warrior, 4133; dam, Francis Folsom, 14210.

Heifer, two years and under three, one entry.

1. J. Fried & Sons, Roseville, Roseville Maid, 35420. Sire, Lord Willison, 24315; dam, Highland Mary, 36835.

Heifer, under two years, two entries.

1. H. Smith, Hay, Barmaid, 37307. Sire, Abbotsford, 19446; dam, Bonnie Brae, 27620.
2. J. Fried & Sons, Roseville, Dandy, Vol. 17. Sire, Kinellar Stamp, 28867; dam, Lucy Bell 2nd 25291.

Dressed Carcass, three entries.

1. J. Fried & Sons, Roseville, Wild Bill. Sire, Lord Willison, 24315; dam, Sunflower, 19205.
2. W. J. Biggins, Clinton, Matchless of Elmhurst 18th, 31394. Sire, Royal Don, 17105, dam, Matchless of Elmhurst, 18570.
3. H. K. Fairbairn, Thedford, Maid of the Mist, 15830. Sire, Warrior, 4133; dam, Frances Folsom, 14210.

Sweepstake—Best Shorthorn steer, two entries.

1. Israel Groff, Alma, Crimson Robe. Sire, Golden Robe, 20396; dam, Crimson Gem.

Sweepstake—Best Shorthorn Cow or heifer, four entries.

1. H. Smith, Hay, Barmaid, 37307. Sire, Abbotsford, 19446; dam, Bonnie Brae, 27620.

Herefords and Polled Angus.

Steer or heifer, two years and under three, two entries.

1. F. W. Stone Stock Co., Guelph, Duchess of Moreton 22nd, 83949. Sire, Barbette, 68977; dam, Duchess of Moreton 14th, 58638.
2. James Bowman, Guelph, Elm Park Bell 3rd, 34620. Sire, Kyma's Heir, 24835; dam, Heather Bell, 22610.

Steer or heifer, one year and under two, three entries.

1. F. W. Stone Stock Co., Guelph, Graceful 93th. Sire, Barbette, 68977; dam, Graceful 93rd, 73990.
2. James Bowman, Guelph, Elm Park Lad 1194. Sire, Emlyn of W. G., 20984; dam, Kyma 6th, 28962.
3. A. McDougall, Guelph, Bessie Blooming, 36921. Sire, Emlyn of W. G., 20984; dam, Blooming Rose 2nd, 20542.

Steer or heifer under one year, four entries.

1. Samuel Young, Binkham, Springside Beauty, 670. Sire, Campbell of Tweedhill, 28216; dam, Coleen of Springside, 555.
2. F. W. Stone Stock Co., Guelph, Peach 36th, 109047. Sire, Lord of Ingleside 4th, 83599; dam, Peach 28th, 63844.
3. James Bowman, Guelph, Kyma 10th, 38850. Sire, Emlyn of W. G., 20984; dam, Kyma 4th, 24537.

Highly Commended, A. McDougall, Guelph, Rosie Bright, 40486. Sire, Oxford King, 24359; dam, Blooming Rose 2nd, 20542.

Cow or heifer, three years and over, three entries.

1. James Bowman, Guelph, Kyma 6th, 28962. Sire, Lord Aberdeen 3rd, 20824; dam, Kyma 3rd, 19809.
2. F. W. Stone Stock Co., Guelph, May Day 3rd, 73993. Sire, Pluto, 63846; dam, May Day, 15976.
3. James Bowman, Guelph, Lass of Tweedhill, 28262. Sire, King Kyma, 15544; dam, Mary of Tweedhill, 14406.

Dressed Carcass, one entry.

1. James Bowman, Guelph,—

Special.

First Premiums won in the above class by Aberdeen Angus, were increased 75 per cent by the American Aberdeen Angus Breeders' Association, if recorded in the Herd Book of the above Association.

GALLOWAYS AND DEVONS.

Steer or heifer, two years and under three, four entries.

1. D. McCrae, Guelph, Ranee 13th, 13973. Sire, Canadian Borderer, 5945; dam, Ranee 10th, 10855.
2. W. J. Rudd, Eden Mills, Bruce. Sire, Butler, 983; dam, Daisy, 1103.
3. W. J. Rudd, Eden Mills, Butler. Sire, Butler, 983; dam, Lady Maud 3rd, 743.

Steer or heifer, one year and under two, two entries.

1. D. McCrae, Guelph, Valetta, 14614. Sire, Czar, 12807; dam, Viscountess 2nd, 3914.
2. D. McCrae, Guelph, Calla Lily, 14615. Sire, Duster, 12961; dam, Celtdine, 10281.

Steer or heifer, under one year, three entries.

1. D. McCrae, Guelph, Belle Rue, 15530. Sire, Cruiser, 12962; dam, Lorn, 11222.
2. T. Lloyd-Jones & Son, Burford, Queen of the Oaks, 17390. Sire, College Gambler, 12808; dam Blanche of the Oaks, 13573.

Cow or heifer, three years and over, two entries.

1. D. McCrae, Guelph, Semiramis 28th, 12793. Sire, College Boy, 10395; dam, Semiramis, 10283.
D. McCrae, Guelph, Maid Minnie, 12959. Sire, College Boy, 10395; dam, Maid Marian B., 9750.

Dressed Carcass, four entries.

1. D. McCrae, Guelph, Semiramis 28th. Sire, College Boy, 10395; dam, Semiramis, 10283.
2. W. J. Rudd, Eden Mills, Butler. Sire, Butler, 983; dam, Lady Maud 3rd, 743.
3. D. McCrae, Guelph, Margaret, 11888.

GRADES OR CROSSES.

Steer, two years and under three, thirteen entries.

1. James Leask, Greenbank, Clinker. Sire, Moneyfuffel Lad, 20521.
2. J. Fried & Sons, Roseville, Look Out. Sire, Lord Willison, 24315.
3. R. J. Robinson, Ailsa Craig, Billy.
Highly Commended, Peter Stewart, Everton, Candidate. Sire, McTurk, 21324. 24315.
Commended, Geo. W. Hill, Cumnock, Wellington Chief. Sire, Greenhouse Chief, 14723.

Steer, one year and under two, nine entries.

1. James Leask, Greenbank, Rock. Sire, Moneyfuffel Lad, 20521.
2. Andrew Richardson, Peepabun, Iroquois. Sire, Lord Stanley 5th 23,376.
3. J. H. Dingle, Hamilton, Roger Stanley. Sire, Duncan Stanley, 16364.
Highly Commended, John Campbell, Woodville, General White. Sire, Lord Willoughby, 20706.
Commended, James Lindsay, Fergus, Bobs. Sire, Bridesman, 23064.

Steer, under one year, nine entries.

1. A. Hales, Guelph, Jumbo.
2. Andrew Richardson, Peepabun, Bobs. Sire, Lord Stanley 5th, 23376.
3. James Leask, Greenbank, Cronje. Sire, Royal Banner, 27652.
Highly Commended, Geo. Clayton, Peepabun. Sire, Gloster, 23670.
Commended, J. Fried & Sons, Roseville, Dumpling. Sire, Kinellar Stamp, 28867.

Cow or heifer, three years and over, four entries.

1. James Bowman, Guelph, . Sire, Lord Aberdeen.
2. Wm. Argo, Eden Mills, Everhill Lass.
3. John Brown, Galt, Rose.
Highly Commended, James Leask, Greenbank, Maud. Sire, Roan Duke.

Heifer, two years and under three, nine entries.

1. James Leask, Greenbank, Flo. Sire, Moneyfuffel Lad, 20521.
2. James Leask, Greenbank, Bess. Sire, Moneyfuffel Lad, 20521.
3. James Scott, Aberfoyle.
Highly Commended, Abram Rudell, Hespeler, Flora.
Commended, James Scott, Aberfoyle.

Heifer, under two years, six entries.

1. J. Fried & Sons, Roseville, Daisy. Sire, Lord Willison, 24315.
2. James Leask, Greenbank, Bell. Sire, Moneyfuffel Lad, 20521.
3. Robert Dawson, Guelph, Nettie.

Highly Commended, Geo. Clayton, Peepabun. Sire, Gloster, 23670.

Special—Best Grade steer, sired by pure-bred Shorthorn bull, twelve entries.

1. James Leask, Greenbank, Clinker. Sire, Moneyfuffel Lad, 20521.

Special—Best pair of fat animals, any age or breed, four entries.

Prize, Silver Cup, donated by Bell Organ & Piano Co., Guelph. This Cup becomes the property of the exhibitor when won twice by different animals. It was won in 1899 by Messrs. Fried & Sons, Roseville.

1. James Leask, Greenbank, Clinker, Flo.

Special—Best animal, any age or breed, nine entries.

Prize, Silver Cup, donated by Thomas Holliday, Guelph. This Cup becomes the property of the exhibitor when one twice by a different animal. It was won in 1898 by Oke and Sons, Alvinston. In 1899 by H. Smith, Hay.

1. James Leask, Greenbank, Clinker.

Grand Sweepstake—Prince of Wale's Prize.

Best Dressed Carcass, any breed, four entries.

1. J. Fried & Sons, Roseville, Wild Bill.

SHEEP.

Cotswold.

Ewe, under one year, two entries.

1. John Park & Sons, Burgessville, Park ewe 317, 21907. Sire, Hopeful, 16182 dam, Park ewe 55, 19985.
2. John Park & Sons, Burgessville, Park ewe 318, 21908. Sire, Hopeful, 16182; dam, Park ewe 56, 19986.

Wether, one year and under two, three entries.

1. John Park & Sons, Burgessville, Oxford Lad. Sire, Hopeful, 16182; dam, Park Ewe 46, 19976.
2. John Park & Sons, Burgessville, Oxford King. Sire, Hopeful, 16182; dam, Park Ewe 47, 19977.
3. John Park & Sons, Burgessville, Oxford Pride. Sire, Hopeful, 16182; dam, Park Ewe 47, 19977.

Wether, under one year, three entries.

1. John Park & Sons, Burgessville, Look Out. Sire, Hopeful, 16182; dam, Rawlings 88, 9470.
2. John Park & Sons, Burgessville, General White. Sire, Hopeful, 16182; dam, Oxford Ewe, 16604.
3. John Park & Sons, Burgessville, General Buller. Sire, Hopeful, 16182; dam, Park Ewe 18, 16599.

Three wethers under one year, one entry.

1. John Park & Sons, Burgessville, Look Out. General White. General Buller.

Three ewes, under one year, one entry.

1. John Park & Sons, Burgessville, Park Ewe 317, 21907. Park Ewe 318, 21908. Park Ewe 319.

Dressed Carcass—Wether, one year and under two, two entries.

1. John Park & Sons, Burgessville, Oxford King. Sire, Hopeful, 16182; dam, Park Ewe 46, 19976.
2. John Park & Sons, Burgessville, Oxford Pride. Sire, Hopeful, 16182; dam, Park Ewe 47, 19977.

Dressed Carcass—Ewe or wether, under one year, one entry.

1. John Park & Sons, Burgessville, General Buller. Sire, Hopeful, 16182; dam, Park Ewe 18, 16599.

Lincolns.

Ewe, under one year, six entries.

1. J. T. Gibson, Denfield, Gibson's 22nd, 8285. Sire, Riby Conquorer, 503; dam, Dudding Ewe 45.
2. J. T. Gibson, Denfield, Gibson's 28, 8291. Sire, Main, 6215; dam, Dudding Ewe.
3. J. T. Gibson, Denfield, Gibson's 29, 8292. Sire, Main, 6215; dam, Dudding Ewe.

Highly Commended, Leonard Parkinson, Eramosa, Parkinson's 197, 8247. Sire, Riby 6th, 4398; dam, Parkinson's 71, 3064.

Commended, Leonard Parkinson, Eramosa, Parkinson's 198, 8249. Sire, Riby 6th, 4398; dam, Parkinson's 76, 2067.

Wether, one year and under two, two entries.

1. J. T. Gibson, Denfield, N. A. 5186. Sire, Riby Conquorer, 503; dam, Barton 5, 866.
2. J. T. Gibson, Denfield, A. D. 5185. Sire, Riby Conquorer, 503; dam, Barton 5th, 866.

Wether, under one year, six entries.

1. J. T. Gibson, Denfield, Gibson's 17, 8280. Sire, Riby Gem, 3324; dam, Dudding Ewe.
2. Leonard Parkinson, Eramosa, Bobs. Sire, Nelson, 5313; dam, Clementine 6th, 3028.
3. J. T. Gibson, Denfield, Gibson's 16, 8279 Sire, Riby Gem, 3324; dam, Dudding Ewe.

Highly Commended, Leonard Parkinson, Eramosa, Buller. Sire, Nelson, 5313; dam, Sophia 2nd, 3029.
Commended, J. T. Gibson, Denfield, Gibson's 15, 8278. Sire, Riby Conquorer, 503; dam, Dudding Ewe.

Three wethers under one year, two entries.

1. J. T. Gibson, Denfield, Gibson's 17, 8280. Gibson's 15, 8278. Gibson's 16, 8279.
2. Leonard Parkinson, Eramosa, Bobs. Buller. Jake.

Three Ewes under one year, three entries.

1. J. T. Gibson, Denfield, Gibson's 22nd, 8285. Gibson's 28, 8291. Gibson's 29, 8292.
2. Leonard Parkinson, Eramosa, Parkinson's 197. Parkinson's 198. Parkinson's 199.
3. Leonard Parkinson, Eramosa, Parkinson's 200. Parkinson's 201. Parkinson's 202.

Dressed carcass, wether, one year and under two, two entries.

1. J. T. Gibson, Denfield.

Dressed carcass, ewe or wether, under one year, two entries.

1. Leonard Parkinson, Eramosa, Bobs.
2. J. T. Gibson, Denfield.

LEICESTERS.

Ewe, under one year, eleven entries.

1. A. & W. Whitelaw, Guelph, Lady White, 4087. Sire Albino, 4077; dam, Mary Anson 2nd, 2490.
2. John Kelly, Shakespeare, Avonhead Lass, 4106. Sire, Bold Tom, 2960; dam, Royal Laura Lee, 1659.
3. A. & W. Whitelaw, Guelph, Lady Roberts, 4084. Sire, Albino, 4077; dam, Little Annie, 2nd, 3143.

Highly Commended, John Kelly, Shakespeare, Trix, 4114. Sire, Bold Tom, 2960; dam, J. C., 1669.
Commended, A. & W. Whitelaw, Guelph, Miss Albino, 4082. Sire, Albino, 4077, dam, Princess 3rd. 1383.

Wether, one year and under two, two entries.

1. Orr & Lillico, Galt, Sandy. Sire, Bunter, 3020; dam, Nice, 1556.
2. Orr & Lillico, Galt, Jack. Sire, Bunter, 3020; dam, Bell, 1562.

Wether, under one year, seven entries.

1. Orr & Lillico, Galt, Bob. Sire, Klondike, 2577; dam, Kate, 1865.
2. John Kelly, Shakespeare, Wrangler, 4428. Sire, Bold Tom, 2960; dam, J. E., 1676.
3. John Kelly, Shakespeare, Bobs, 4427. Sire, Bold Tom, 2960; dam, Queen of the West, 511.

Highly Commended, Orr & Lillico, Galt Bill. Sire, Klondike, 2577; dam, Bess, 1899.
Commended, Orr & Lillico, Galt, Jim, Sire, Klondike, 2577; dam, Annie, 1562.

Three wethers, under one year, three entries

1. Orr & Lillico, Galt, Bob. Bill. Jim.
2. John Kelly, Shakespeare, Wrangler, 4428. Bobs, 4427. Tom.
3. Orr & Lillico, Galt, Sam. Jack. Joe.

Three ewes, under one year, four entries

1. A. & W. Whitelaw, Guelph, Lady White, 4087. Miss Albino, 4082,. Lady Roberts, 4084.
2. John Kelly, Shakespeare, Trix, 4114 Eva Kelly, 4115. Dora, 4117.
3. John Kelly, Shakespeare, Pearl Kelly, 4109. Avonhead, 4106. Eva, 4118.

Highly Commended, Orr & Lillico, Galt, Bertha, 4276. Maud, 4279. Lady, 4277.

Dressed carcass, wether, one year and under two, one entry.

1. Orr & Lillico, Galt, Sandy. Sire, Bunter, 3020; dam, Nice, 1556.

Dressed carcass, ewe or wether, under one year, two entries.

1. Orr & Lillico, Galt, Bob, Sire. Klondike, 2577; dam, Kate, 1865.
2. John Kelly, Shakespeare.

Oxford ewe, under one year, fourteen entries.

1. Kenneth Finlayson, Campbellton, Finlayson's 95, 22278. Sire, Kempford Hero 8th, 16445; dam, Achmore Lady, 2nd, 8262.
2. Smith Evans, Gourock, Evans, 373, 21073. Kempford Hero, 16414; dam, Evans, 258, 14640.

3. Andrew Elliott, Pond Mills, Pond Mills, 84, 21529. Sire, Summerhill Star, 5th, 12044; dam, Pond Mills Minnie, 12808.

Highly Commended, J. H. Jull, Mount Vernon, Brant Queen, 229, 20777. Sire Brant's King Langley, 17512; dam, Mapleton Belle, 13156.

Commended, Kenneth Finlayson, Campbellton, Finlayson's 94, 22277. Sire, Kempford Hero 8th, 16445; dam, Inverell's Dora, 13917.

Wether, one year and under two, two entries.

1. Andrew Elliott, Pond Mills, Pond Mills Jim. Sire, Pond Mills Jack, 12605; dam, Adams' 105, 6527.

2. Andrew Elliott, Pond Mills, Pond Mills Joe. Sire, Pond Mills Jack, 12605; dam, Pond Mills, 32, 15515.

Wether, under one year, five entries

1. Smith Evans, Gourock, Evans' 403, 22202. Sire, Kempford Hero, 16414; dam, Evans' 238 12429.
2. Smith Evans, Gourock, Evans' 404, 22203. Sire, Kempford Hero, 16414; dam, Evans' 238, 12429.
3. Smith Evans, Gourock, Evans' 401, 22204. Sire, Evans' 357, 18403; dam, Mapleton Belle 8, 12448.

Highly Commended, Andrew Elliott, Pond Mills, Pond Mills Sam. Sire Summerhill Star 5th, 12044, dam, Pond Mills Jane, 12601.

Three wethers under one year, two entries.

1. Smith Evans, Gourock, Evans' 403, 22202. Evans' 404, 22203. Evans' 401, 22204.
2. Andrew Elliott, Pond Mills Sam. Pond Mills Bill. Pond Mills Nick.

Three ewes under one year, five entries.

1. Kenneth Finlayson, Campbellton, Finlayson's 95. Finlayson's 94. Finlayson's 93.
2. Smith Evans, Gourock, Evans' 373. Evans' 371. Evans' 384.
3. J. H. Jull, Mount Vernon, Brant Queen 255, 20799. Brant's Queen, 229, 20777. Brant's Queen 232, 20781.

Highly Commended, Smith Evans, Gourock, Evans' 388. Evans' 380. Evans' 386.

Commended, Andrew Elliott, Pond Mills, Pond Mills 84, 21529. Pond Mills 83, 21526. Pond Mills 85, 21539.

Dressed carcass, wether, one year and under two, two entries.

1. Andrew Elliott, Pond Mills, Pond Mills Jim. Sire, Pond Mills Jack, 12605; dam, Adams' 105 6527.

2. Andrew Elliott, Pond Mills, Pond Mills Joe. Sire, Pond Mills Jack, 12605; dam, Pond Mills, 32, 15515.

Dressed carcass, ewe or wether, under one year, three entries.

1. Andrew Elliott, Pond Mills, Pond Mills Nick.
2. Smith Evans, Gourock, Evans' 401.
3. Andrew Elliott, Pond Mills, Pond Mills Bill.

SHROPSHIRES.

Shropshire ewe, under one year, ten entries.

1. John Campbell, Woodville, Campbell's 971, 143742. Sire, Newton's Lord, 30983; dam, Campbell's 815, 112937.

2. John Campbell, Woodville, Campbell's 963, 143739. Sire Newton Lord, 30983; dam, Campbell's 780, 99640.

3. D. G. & J. G. Hanmer, Mount Vernon, J.P.P. 775, 145312. Sire, Miller's 4222, 128502; dam, J. P. Phin's 511, 88409.

Highly Commended, Abram Rudell, Hespeler, A. Rudell's 175, 148949. Sire, Hanmer's 1277, 144054; dam, Rudell's 150, 130384.

Commended, D. G, & J. G. Hanmer, Mount Vernon, J. P. Phin's 767, Sire, Miller's 4222, 128502; dam, J. P. Phin's 544, 94003.

Wether, one year and under two, eight entries.

1. John Campbell, Woodville, The Model, 135210. Sire, The Best Type, 88775; dam, Campbell's 776, 99634.

2. John Campbell, Woodville, Hopeful, 134529. Sire, Tantalizer, 59972; dam, Bale's 10, 55105.

3. D. G. & J. G. Hanmer, Mount Vernon, Conworth's 339, 134127. Sire, Mayor 266, 99271; dam, Conworth's 224, 86646.

Highly Commended, R. Gibson, Delaware, Gibson's 602, 135002. Sire, Martinet, 116685; dam, Gibson's 417, 95977.

Commended, W. H. Beattie, Wilton Grove, Beattie's 741, 134055. Sire, Beattie's 696, 127956; dam, Beattie's 551, 87733.

Wether, under one year, nine entries.

1. R. Gibson, Delaware, King of the Show, 149492. Sire, Martinet, 116685; dam, Gibson's 419, 94170.

2. R. Gibson, Delaware, King Jim 2nd, 149489, Sire, Martinet, 116685; dam, Hindmarsh 3rd, 115112.

3. John Campbell, Woodville, Campbell's 977, 145184. Sire, Fair Star Dreamer, 99630; dam, Campbell's 842, 128413.

Highly Commended, R. Gibson, Delaware, Campbell's 977. Sire, Fair Star Dreamer, 99630; dam, Campbell's 842, 128413.

Commended, R. Gibson, Delaware, Knocker-out, 149491. Sire, Martinet, 116685; dam, Gibson's 19, 94170.

Three wethers, under one year, four entries,

1. R. Gibson, Delaware, King Jim 2nd, 149489. Sire, Knocker-out, 149491 ; King of the Show, 149492.
2. R. Gibson, Delaware, King Cardinal, 149488. King Dream, 149490 Campbe l's 977, 145184.
3. W. E. Wright, Glanworth, Wright's 357, 149501. Wright's 360 Wright's 380.

Highly Commended, T. Lloyd-Jones & Sons, Burford, Lloyd-Jones' 151. Lloyd-Jones' 195. Lloyd-Jones' 196.

Three ewes, under one year, three entries.

1. John Campbell, Woodville, Campbell's 971, 143742. Campbell's 963, 143739. Campbell's 965, 143740
2. D. G. & J. G. Hanmer, Mount Vernon.
3. Abram Rudell, Hespeler, A. Rudell's 175, 148949. A. Rudell's 185, 148939. A. Rudell's 192, 148946.

Dressed carcass, wether, one year and under two, five entries.

1. T. Lloyd-Jones & Sons, Burford, Lloyd-Jones' 193.
2. D. G. & J. G. Hanmer, Mount Vernon,
3. John Campbell, Woodville, Hopeful, 134529. Sire, Tantalizer, 59972 ; dam, Bale's 10, 55105.

Dressed carcass, ewe or wether, under one year, four entries.

1. R. Gibson. Deleware.
2. T. Lloyd-Jones & Sons, Burford, Lloyd-Jones 195.
3. W. E. Wright, Glanworth. Sire, Wattie, 115142 ; dam, Davis, 2nd, 60573.

Southdown ewe, under one year, eleven entries.

1. John Jackson, Abingdon, Jackson ewe 92 B, 13802. Sire, Easter Lad, 12096 ; dam, Jackson ewe 120, 10269.
2. John Jackson & Sons, Abingdon, Jackson ewe 94 B, 13804. Sire. Easter Lad, 12096 ; dam, Jackson ewe 81 A, 7467.
3. Robert McEwen, Byron, McEwen's ewe 36, 13816. Sire, Stanstead 2nd, 7281 ; dam, Lillie, 9186.

Highly Commended, William Martin, Binbrook, Martin ewe 20 A, 13924. Sire, Jackson 4, 10246 ; dam, Simenton ewe 47; 8307.

Commended, John Jackson & Sons, Abingdon, Jackson ewe 98 B, 13807. Sire, Easter Lad, 12096 ; dam, Jackson ewe 6 B, 9933.

Wether, one year and under two, ten entries.

1. W. E. Wright, Glanworth, Perfection, 13414. Sire, Stanstead, 7281 ; dam, Lady Webb, 7970.
2. Telfer Bros., Paris, Tom Sire, Telfer's 2. 9798 ; dam, Telfer ewe 32, 5725.
3. Hon. Geo. A. Drummond, Beaconsfield, Point Claire, Que Sire, St. Andrew, 12589 ; dam, Drummond No. 44, 12625.

Highly Commended, Telfer Bros., Paris, Dick. Sire, Martin 10, 9378 ; dam, Telfer ewe 30, 5740.

Commended, John Jackson & Sons, Abingdon, Jackson's 2. Sire, Martin 13, 10328 ; dam, Simenton ewe, 72, 9396.

Wether, under one year, eleven entries.

1. T. C. Douglas, Galt, A1. Sire, Chichester King, 9427 ; dam, Douglas ewe 67, 9399.
2. John Jackson & Sons, Abingdon, Jackson's 59. Sire, Easter Lad, 12096 ; dam, Jackson ewe 63 B, 11832.
3. John Jackson & Sons, Abingdon, Jackson's 66. Sire, Easter Lad, 12096 ; dam, Jackson ewe 19 B, 9942.

Highly Commended. W. H. Beattie, Wilton Grove, The Lad for Me. Sire, Stanstead 2nd, 7281 ; dam, Dale ewe, 10936.

Commended, T. C. Douglas, Galt, A 2. Sire, Chichester King, 9427 ; dam, Douglas ewe 68, 9400.

Three wethers, under one year, four entries.

1. T. C. Douglas, Galt, A1. A2. A3.
2. John Jackson & Sons, Abingdon, Jackson's 59. Jackson's 66. Jackson's 56.
3. Telfer Bros., Paris, Jack. Pat. Harry.

Highly Commended, Wm. Martin, Binbrook, Martin wether 1. Martin wether, 2. Martin wether, 3.

Three ewes under one year, four entries.

1. John Jackson & Sons, Abingdon, Jackson ewe 92 B, 13802 Jackson ewe 94 B, 13804. Jackson ewe 98 B, 13807.
2. Robt. McEwan, Byron, McEwen ewe 41, 13942. McEwen ewe 36, 13816. McEwen ewe 38, 13817.
3. Wm. Martin, Binbrook, Martin ewe 20 A, 13924. Martin ewe 21 A, 13925. Martin ewe 22 A, 13926.

Highly Commended, T. C. Douglas, Galt, Douglas ewe 128. Douglas ewe 129. Jackson ewe, 95 B.

Dressed carcass, wether, one year and under two, six entries.

1. Telfer Bros., Paris.
2. W. E. Wright, Glanworth, Perfection, 13414. Sire, Stanstead 2nd, 7281 ; dam, Lady Webb, 7970.
3. W. H. Beattie, Wilton Grove, Bob, 12781. Sire, Stanstead 2nd, 7281 ; dam, Maretia, 10893.

Dressed carcass, ewe or wether, under one year, three entries.

1. Telfer Bros., Paris.
2. John Jackson & Sons, Abingdon, Jackson's 59. Sire, Easter Lad, 12096 ; dam, Jackson ewe 63 B, 11832.
3. T. C. Douglas, Galt, A3.

DORSET HORNS AND MERINOS.

Ewe, under one year, two entries.

1. R. H. Harding, Thorndale, Lady, 1685. Sire, Lord Roberts, 1333; dam, Harding's 83, 317.
2. R. H. Harding, Thorndale, Lilly, 1686. Sire, Lord Beaconsfield, 786; dam, McLee's 33, 1477.

Wether, one year and under two, three entries.

1. W. E. Wright, Glanworth, Charlie. Sire, Harding's 96, 534; dam, Harding's 41, 464.
2. R. H. Harding, Thorndale. Sire, Capt. Ellison, 319; dam, Harding's 16, 327.
3. R. H. Harding, Thorndale, Sire, Capt. Ellison, 319; dam, Harding's 83, 339.

Wether, under one year, three entries.

1. R. H. Harding, Thorndale. Sire, Lord Beaconsfield, 786; dam Charlotte, 329.
2. R. H. Harding, Thorndale.
3. R. H. Harding, Thorndale.

Dressed carcass, ewe or wether, one year and under two, three entries.

1. W. E. Wright, Glanworth, Charlie. Sire, Harding's 96, 534; dam, Harding's 41, 464.
2. R. H. Harding, Thorndale.
3. R. H. Harding, Thorndale.

Dressed carcass, ewe or wether, under one year, two entries.

1. R. H. Harding, Thorndale.
2. R. H. Harding, Thorndale.

HAMPSHIRES AND SUFFOLKS.

Ewe, under one year, two entries.

1. John Kelly, Shakespeare, Minnie, 6425 (Hampshire).

Wether, one year and under two, four entries.

1. W. J. Rudd, Eden Mills, Rudd's 49. Sire, Abe, 238; dam, Rudd's 226.
2. James Bowman, Guelph, W. J. Rudd 48. Sire, Abe, 238; dam, O.A.C., 213.
3. W. J. Rudd, Eden Mills, Rudd's 50. Sire, Abe, 238; dam, O.A.C., 246.

Highly Commended, W. J. Rudd, Eden Mills, Rudd's 51. Sire, Abe, 238; dam, W.B.C., 223.

Dressed carcass, ewe or wether, one year and under two, three entries.

1. W. J. Rudd, Eden Mills, Rudd's 52. Sire Abe, 238; dam, Rudd's 227.
2. James Bowman, Guelph, W. J. Rudd, 48. Sire, Abe, 238; dam, O.A.C., 213.
3. W. J. Rudd, Eden Mills, Rudd's 53. Sire, Abe, 238; dam, Rudd's 228.

SHROPSHIRE SPECIALS.

Prizes offered by the American Shropshire Record Association.

Wether, one year and under two, five entries

1. John Campbell, Woodville, The Model, 133210. Sire, The Best Type, 88775; dam, Campbell's 776, 99634.
2. John Campbell, Woodville, Hopeful, 134529. Sire, Tantalizer, 59072; dam, Bale's 10, 55105.

Wether, under one year, six entries.

1. R. Gibson, Delaware.
2. R. Gibson, Delaware.

Three ram lambs, seven entries.

1. John Campbell, Woodville, The Magistrate, 145183. Sire, The Baron, 143733 dam, Paragon's Star, 149890
2. John Campbell, Woodville The Duke, 143735. Sire, The Parson, 145182; dam. Paragon Eclipse, 149889
3. D. G. & J. G. Hanmer, Mount Vernon Rudell's 177, 144765. Sire, J. P. Phin's 777, 144333, dam Ledger's 119, 148951.

Wether sired by registered Shropshire ram, out of Grade ewe, one year and under two, five entries.

1. John Campbell, Woodville, Sire, Harrison's 235, 61709.
2. Lloyd-Jones & Sons, Burford, Lloyd-Jones 194.

Wether sired by registered Shropshire ram, out of Grade ewe, under one year, six entries.

1. R. Gibson, Deleware, Keepsake. Sire, Falstaff, 79138.
2. John Campbell, Woodville, Sire, Fairview Dreamer, 143612.

LEICESTER SPECIALS.

Prizes offered by the American Leicester Breeders' Association.

Pen of three lambs, four entries.

1. A. W. Whitelaw, Guelph, Lady White, 4087. Miss Albino, 4082. Lady Roberts, 4084.
2. John Kelly, Shakespeare,
3. Orr & Lillico, Galt, Bertha, 4276. Lady, 4277. Maud, 4279.

OXFORD SPECIALS.

Prizes offered by American Oxford Down Record Association.

Yearling wethers, one entry.

1. Andrew Elliott, Pond Mills, Pond Mills Jim.

Lamb, ewe or wether, five entries.

1. Kenneth Finlayson, Campbellton, Finlayson's 95, 22278.

Yearling wether's carcass, one entry.

1. Andrew Elliott, Pond Mills, Pond Mills, Jim.

Wether Lamb's carcass, two entries.

1. Smith Evans, Gourock, Evans 401,

Sweepstake,—Best animal in class for Cotswolds. Prize ; A "Corn Scuffler," donated by Thom's Implement Works, Watford, Ont. Value $10. One entry.

1. John Park & Sons, Burgessville.

Sweepstake,—Best animal in class for Lincolns. Prize ; General purpose plow, donated by the Massey-Harris Co., Toronto, Ont. Value, $15. Two entries.

1. J. T. Gibson, Denfield.

Sweepstake,—Best animal in class for Leicester. Prize ; A Grain Grinder, donated by S. Vessot & Co. Jolliette, Que. Value $40. Two entries.

1. A. W. Whitelaw, Guelph.

Sweepstake,—Best animal in class for Oxfords. Prize ; A Folding Lawn Swing, donated by the Waggoner Ladder Co., London, Ont. Value $10. Two entries.

1. Kenneth Finlayson, Campbellton.

Sweepstake,—Best animal in class for Shropshire. Prize ; A Sheep Shearing Matchine, donated by the Chicago Flexible Shaft Co., Chicago, Ill. Value, $15. Four entries.

1. R. Gibson, Delaware.

Sweepstake,—Best animal in class for Southdowns. Prize ; plow, donated by J. Fleury's Sons, Aurora, Ont. Seven entries.

1. W. E. Wright, Glanworth.

Sweepstake,—Best animal in class for Dorset Horns and Merinos. Prize ; One ton of Rock Salt, donated by the Toronto Salt Works, Toronto, Ont. Two entries.

1. R. H. Harding, Thorondale,

Sweepstake,—Best animal in class for Hampshires and Suffolks. Prize ; Five gallons West Chemical Fluid, donated by West Chemical Co., Toronto, Ont. One entry.

1. John Kelly, Shakespeare, Minnie, 6425. (Hampshire.)

GRADES AND CROSSES.

Ewe, one year and under two, seven entries

1. John Campbell, Woodville, Sire, Newton Lord, 30983.
2. T. C. Douglas, Galt, Lady R. Sire, Gordon 3rd, 11291.
3. James Scott, Aberfoyle, Bertha.
   Highly Commended, John Campbell, Woodville, Sire, Major, 128842.

Wether, one year and under two, twelve entries.

1. John Campbell, Woodville, Sire, Major, 128842.
2. W. E. Wright, Glanworth, Jumbo. Sire, Wattie, 11542.
3. T. Lloyd-Jones & Son, Burford, Lloyd-Jones, 194.
   Highly commended, T. C. Douglas, Galt, Scott. Sire, Scott's ram.
   Commended, Telfer Bros., Paris, Billy. Nicholl's Favorite, 124835.

Three wethers, under one year four entries.

1. John Campbell, Woodville.
2. R. Gibson, Delaware, Keepsake, King of the Castle. King's Arcam.
3. Orr & Lillico, Galt, Pet. Bob. Sam.
   Highly commended, W. E. Wright, Glanworth.

Wether under one year, twelve entries.

1. R. Gibson, Delaware.
2. John Campbell, Woodville, Sire Fairview Dreamer, 143612.
3. W. E. Wright, Glanworth, Ben.
   Highly commended, Leonard Parkinson, Eramosa, Frank.
   Commended, John Campbell, Woodville, Sire, Major, 128842.

Ewe, under one year, six entries.

1. John Campbell, Woodville, Sire, Newton Lord, 30983.
2. R. H. Harding, Thorndale.
3. J. T. Gibson, Denfield.
   Highly Commended, John Campbell, Woodville, Sire, Tom, 147260.
   Commended, John Kelly, Shakespeare.

Best ewe or wether, under two years, five entries.

1. W. E. Wright, Glanworth,—
2. Highly Commended, John Campbell, Woodville, Sire, Major 128842.

Dressed carcass, ewe or wether, one year and under two, seven entries.

1. John Campbell, Woodville, Sire Newton Lord, 30983.
2. Telfer Bros., Paris, Sire, Nicholl's Favorite, 124835.
3. W. E. Wright, Glanworth.

Highly Commended, James Bowman, Guelph.

Dressed carcass, ewe or wether, under one year, nine entries.

1. R. H. Harding, Thorndale.
2. W. E. Wright, Glanworth.
3. John Kelly, Shakespeare.

Grand Sweepstake,—Best sheep carcass any breed; Prize, Silver Medal, donated by the Traders' Bank Guelph, Ont., A. F. H. Jones, Manager

1. John Campbell, Woodville.

SWINE.

Berkshires.

Barrow, six months and under nine, four entries.

1. George Green, Fairview, Black Sam. Sire, Golden King 10th, 7758; dam, Lady Aberdeen, 4851.
2. Durham & Cavan, East Toronto, York Lodge Fashion Boy. Sire, Fitz Majestic, 8077; dam, Windsor Fashion 22nd, 8150.
3. George Green, Fairview, Black Jack. Sire, Golden King 10th, 7758; dam, Lady Aberdeen, 4851.

Barrow under six months, six entries.

1. George Green, Fairview, Duke. Sire, King Highclere 1st, 6190; dam, Sally 5th, 4946.
2. George Green, Fairview, Bert. Sire, King Highclere 1st, 6190; dam, Sally 5th, 4946.
3. Snell & Lyons, Snelgrove, Kruger. Colonel Brant, 5950; dam, Norval Maid, 6409.

Highly Commended, Snell & Lyons, Snelgrove, Dandy Jim. Sire, Colonel Brant, 5950; dam, Norval Maid, 6409.

Commended Durham & Cavan, East Toronto, Y. L. Harvest Boy. Sire, Elmo Harvester, 8030; dam, Lady Halle, 8061.

Sow, nine months and under fifteen, eight entries.

1. Snell & Lyons, Snelgrove, Lady Shields, 7697. Sire, Colonel Otter, 7697; dam, Bell of Milton, 5020.
2. George Green, Fairview, Artful Belle, 7778. Sire, Aberdeen, 5527; dam, Minnie Lee, 5138.
3. George Green, Fairview, Golden Drop, 7376. Sire, Halle, 5089; dam, Gipsy, 4525.

Highly Commended, George Kitching, Corwhin, My Lass, 8177. Sire, Silver Chief, 5647; dam, Fire Escape Girl, 3813.

Commended, Snell & Lyons, Snelgrove, Maid of the Mist, 8198. Sire, Dictator, 5944; dam, Lady Hillock, 7266.

Sow, six months and under nine, fifteen entries.

1. George Green, Fairview, Model Queen, 8169. Sire, Golden King 1st, 7758; Lady Aberdeen, 4851.
2. Snell & Lyons, Snelgrove, Miss Prim, 8183. Sire, Colonel Brant, 5950; dam, Patsy Girl, 6555.
3. Snell & Lyons, Snelgrove, The Duchess, 7703. Sire, Gallant Prince, 7691; dam, Morning Mis 6594.

Highly Commended, George Green, Fairview, Fairview Queen, 8175. Sire, Star, 3202; dam, Fashion, 5218.

Commended, George Green, Fairview, Kitchen Girl, 8162. Sire, General White, 7430; dam, Kitchen Maid, 5379.

Sow under six months, nine entries.

1. Snell & Lyons, Snelgrove, Pleasant Maid, 8184. Sire, Colonel Brant, 5950; dam, Norval Maid, 6409.
2. Snell & Lyons, Snelgrove, Lady Maid, 8185. Sire, Colonel Brant, 5950; dam, Norval Maid, 6409.
3. James A Russell, Precious Corners, Black Polly, 8134. Sire, Cervera, 5911; dam, Nancy, 6479.

Highly Commended, George Green, Fairview, Silver Maid, 8170. Sire, King Highclere 1st, 6190; dam, Royal Lady, 4150.

Commended, Durham & Cavan, East Toronto, Y. L. Halle Lassie, 8062. Sire, Elmo Harvester, 8030; dam, Lady Halle, 8061.

Three pigs, the offspring of one sow, bred by exhibitor, six entries.

1. Snell & Lyons, Snelgrove, Morning Lilly, 7699. The Duchess, 7703. Morning Maid, 8182.
2. George Green, Fairview, Model Queen, 8169. Black Sam. Black Jack.

YORKSHIRE.

Barrow, six months and under nine, four entries.

1. Brethour & Saunders, Burford, Oak Lodge Nip. Sire, O. L. Conquorer, 2475; dam, O. L. Cinderlla, 2347.
2. H. Dedels, Breslau, Jack. Sire, Goliath, 3562; dam, Breslau Beauty, 2300.
3. Brethour & Saunders, Burford, Oak Lodge Tuck. Sire, O. L. British Hero, 4211; dam, O. L. Clara 15th, 4372.

Barrow under six months, five entries.

1. Brethour & Saunders, Burford, Oak Lodge Bacon. Sire, O. L. Royal King, 3044; dam, O. L. Pride 5th, 3095.
2. J. Featherston & Son, Streetsville, Buller. Sire, Britannia Wonder, 3028; dam, Oxford Lass, 2708.
3. Brethour & Saunders, Burford, Oak Lodge Perfection. Sire, O. L. Royal King, 3044; dam, O. L. Pride, 5th, 3095.

Highly Commended, H. Dedels, Breslau, Fred. Sire, Goliath, 3562; dam, Look at Me, 4506.

Commended, H. Dedels, Breslau, Long Tom. Sire, Goliath, 3562; dam, Look at Me, 4506.

Sow, nine months and under fifteen, three entries.

1. Brethour & Saunders, Burford, O. L. Julia 13th, 4731. Sire, O. L. Swell, 3043, dam, O. L. Julia 5th, 2495.
2. J. Featherston & Son, Streetsville, Whiston Maid 5th, 5272. Sire, Britannia Wonder, 3028; dam, May Beauty, 3271.
3. H. Dedels, Breslau, Summerhill Fame, 4756. Sire, Goliath, 3562; dam, Floss, 3539.

Sow, six months and under nine, eight entries.

1. J. Featherston & Son, Streetsville, Jessie 3rd, 5269. Sire, Britannia Wonder, 3028; dam, Jessie, 2609.
2. Brethour & Saunders, Burford, O. L. Cinderella 36th, 4823. Sire, O. L. Conquorer, 2475; dam, O. L. Cinderella, 2347.
3. Brethour & Saunders, Burford, O. L. Cinderella 37th, 4824. Sire, O. L. Conquorer, 2475; dam, O. L. Cinderella, 2347.

Highly Commended, Brethour & Saunders, Burford, O. L. Cinderella 42nd. Sire, O. L. Conquorer, 2475; dam, O. L. Cinderella, 2347.

Commended, H. Dedels, Breslau, Emma, 5276. Sire, Goliath, 3562; dam, Breslau Beauty, 2300.

Sow, under six months, eight entries.

1. Brethour & Saunders, Burford, O. L. Pride 14th, 5153. Sire, O. L. Royal King 3044; dam, O. L. Pride 5th, 3095.
2. H. Dedels, Breslau, Mattie, 5218. Sire, Goliath 3562; dam, Look at Me, 4506.
3. Brethour & Saunders, Burford, O. L. Pride 15th, 5154. Sire, O. L. Royal King, 3044; dam O. L. Pride 5th, 3095.

Highly Commended, H. Dedels, Breslau, Effie May, 5215. Sire, Goliath, 3562; dam, Look at Me, 4506.

Commended, H. Dedels, Breslau, Selina, 5220. Sire, Goliath, 3562; dam, Look at Me, 4506.

Three pigs, the offspring of one sow, bred by exhibitor, three entries.

1. Brethour & Saunders, Burford, O. L. Pride 14th, 5153. O. L. Pride 15th, 5154; O. L. Perfection 5155.
2. Brethour & Saunders, Burford, O. L. Cinderella 36th, 4823. O. L. Cinderella 37th, 4824. O. L. Cinderella 39th, 5152.

CHESTER WHITES.

Barrow, six months and under nine, four entries.

1. Bennett & Pardo, Charing Cross, Phil. Sire, Jubilee Chief, 860; dam, Found at Last, 1040.
2. Bennett & Pardo, Charing Cross, Cyril. Sire, Jubilee Chief, 860; dam, Found at Last, 1040.
3. D. DeCourcy, Bornholm, White. Sire, King George, 1214; dam, Sylvesta, 925.

Barrow, under six months, four entries.

1. D. DeCourcy, Bornholm, Admirer. Sire, American King, 1097 ; dam, Canada Best, 834.
2. D. De Courcy, Bornholm, Admiral Sire, American King, 1097 ; dam, Canada Best, 834.
3. Bennett & Pardo, Charing Cross, Tommie. Sire, Jubilee Chief, 860 ; dam, Wonderful, 1328.

Highly Commended, Sammie. Sire, Jubilee Chief, 860 ; dam, Wonderful, 1328.

Sow, nine months and under fifteen, five entries.

1. H. George & Sons, Crampton, Katie. Sire, Crown King, 1031 ; dam, Mabel, 893.
2. D. DeCourcy, Bornholm, Annie, 1699. Sire, American King, 1097 ; dam, Francey, 854.
3. Bennett & Pardo, Charing Cross, Hazel, 1710. Sire, Canadian Hero, 1216 ; dam, Pride of Kent, 934.

Highly Commended, John Silverthorn, Scotland, Lottie, 1618. Sire, Scotland King, 1234 ; dam, Anna Lee, 1034.

Commended, H. George & Sons, Crampton, Annie. Sire, Crown King, 1031 ; dam, Mabel, 893.

Sow, six months and under nine, eight entries.

1. H. George & Sons, Crampton, Minnica. Sire, Chester Monarch, 1371 ; dam, Mabel, 893.
2. D. DeCourcy, Bornholm, Loretta, 1702. Sire, King George, 1214 ; dam, Sylvesta, 925.
3. John Silverthorn, Scotland, Daisy, 1617. Sire, Scotland King, 1234 ; dam, Anna Lee, 1034.

Highly commended, John Silverthorn, Scotland, Daisy 2nd, 1692. Sire, Scotland King, 1234 ; dam, Anna Lee, 1034.

Commended, D. DeCourcy, Bornholm, . Sire, King George, 1214 ; dam, Sylvesta, 925.

Sow under six months, eight entries.

1. Bennett & Pardo, Charing Cross, Zel., 1712. Sire, Jubilee Chief, 860 ; dam, Wonderful Girl, 1328.
2. H. George & Sons, Crampton, Hannah. Sire, Crown King, 1031 ; dam, Chester Queen, 531.
3. D. DeCourcy, Bornholm, Flossie, 1700. Sire, American King, 1097 ; dam, Canada's Best, 834.

Highly commended, Bennett & Pardo, Charing Cross, Ray, 1711. Sire, Jubilee Chief, 860 ; dam, Wonderful Girl., 1328.

Commended, Bennett & Pardo, Charing Cross, Ann, 1708. Sire, Jubilee Chief, 860 ; dam, Wonderful Girl, 1328.

Three pigs, the offspring of one sow, bred by exhibitor, five entries.

1. D. DeCourcy, Bornholm, Loretta, 1702. Louise, 1703. White.
2. Bennett & Pardo, Charing Cross.

POLAND CHINAS.

Barrow, six months and under nine, three entries.

1. W. M. & J. C. Smith, Fairfield Plains, Jack. Sire, Lord Kitchener, 1260 ; dam, Carry Ida, 1162.
2. W. M. & J. C. Smith, Fairfield Plains, Bill. Sire, Lord Kitchener, 1260 ; dam, Carry Ida, 1162.
3. W. M. & J. C. Smith, Fairfield Plains, Jim. Sire, Oxford Lad, 1475 ; dam, Fairfield Girl, 1402.

Barrow, under six months, three entries.

1. W. M. & J. C. Smith, Fairfield Plains, Canadian. Sire, Jim's Choice, 1127 ; dam, Rosa Bonheur, 1396.
2. W. M. & J. C. Smith, Fairfield Plains, Dan. Sire, Harold, 1140 ; dam, Bacon Queen, 1432.
3. W. M. & J. C. Smith, Fairfield Plains, Mike. Sire, Harold, 1140 ; dam, Bacon Queen, 1432.

Sow, nine months and under fifteen, three entries.

1. W. M. & J. C. Smith, Fairfield Plains, Fairfield Queen, 1474. Sire, Conrad's Model, 990 ; dam, Black Bess 3rd. 1221.
2. W. M. & J. C. Smith, Fairfield Plains, Maud, 1469. Sire, Jones' Choice, 1127 ; dam, Rosa Bonheur, 1396.
3. W. M. & J. C. Smith, Fairfield Plains, Fairfield Ethel, 1510. Sire, Jones' Choice, 1127 ; dam, Rosa Bonheur, 1396.

Sow, six months and under nine, three entries.

1. W. M. & J. C. Smith, Fairfield Plains, China Sue, 1479. Sire, Lord Kitchener, 1260 ; dam, Carry Ida, 1162.
2. W. M. & J. C. Smith, Fairfield Plains, China Milly, 1480. Sire, Lord Kitchener, 1260 ; dam Carry Ida, 1162.
3. W. M. & J. C. Smith, Fairfield Plains, Fairfield Annie, 1505. Sire, Lord Kitchener, 1260 ; dam Carry Ida, 1162.

Sow, under six months, three entries.

1. W. M. & J. C. Smith, Fairfield Plains, Fairfield Bessie, 1506. Sire, Harold, 1140 ; dam, Bacon Queen, 1432.
2. W. M. & J. C. Smith, Fairfield Plains, Fairfield Carry, 1507. Sire, Harold, 1140 ; dam, Bacon Queen, 1432.
3. W. M. & J. C. Smith, Fairfield Plains, Fairfield Dolly, 1508. Sire, Harold, 1140 ; dam, Bacon Queen, 1432.

Three pigs, the offspring of one sow, bred by exhibitor, two entries.

1. W. M. & J. C. Smith, Fairfield Plains, Maud, 1469. Fairfield Ethel, 1510. Canadian Barrow, 1499.
2. W. M. & J. C. Smith, Fairfield Plains, China Milly, 1480. Sire, China Sue, 1479; dam, Fairfield Annie, 1505.

ESSEX.

Barrow, six months and under nine, three entries.

1. T. A. McClure, Meadowvale, Cardiff. Sire, Paardeberg, 46; dam, Model Beauty, 30.
2. J. Featherston & Son, Streetsville, Fuller. Sire, Paardeberg, 45; dam, Daisy Maid, 40.
3. J. Featherston, Streetsville, Cronje. Sire, Paardeberg, 45; dam, Daisy Maid. 40.

Barrow, under six months, three entries.

1. J. Featherston & Son, Streetsville, Tom. Sire, Paardeberg, 45; dam, Black Cloud, 31.
2. J. Featherston & Son, Streetsville, Dick. Sire, Paardeberg, 45; dam, Black Cloud, 31.
3. T. A. McClure, Meadowvale, Champion. Sire, Paardeberg, 45; dam, Princess Lacole, 35.

Sow, nine months and under fifteen, three entries.

1. T. A. McClure, Meadowvale, Topsy Maid, 52. Sire, Model B., 11; dam, Topsy Jane, 18.
2. J. Featherston & Son, Streetsville, Emily, 43. Sire, Model B., 11; dam, Topsy Jane, 18.
3. J. Featherston & Son, Streetsville, Julia, 44. Sire, Model B., 11; dam, Topsy Jane, 18.

Sow, six months and under nine, three entries.

1. J. Featherston & Son, Streetsville, Florence, 48. Sire, Paardeberg, 45; dam, Daisy Maid, 40.
2. J. Featherston, Streetsville, Floss, 49. Sire, Paardeberg, 45; dam, Daisy Maid, 40.
3. T. A. McClure, Meadowvale, Cardiff Maid, 50. Sire, Paardeberg, 45; dam, Model Beauty, 30.

Sow, under six months, three entries.

1. T. A. McClure, Meadowvale, Maid of Honor, 51. Sire, Paardeberg, 45; dam, Princess Lacole, 35.
2. J. Featherston & Son, Streetsville, Dolly, 47. Sire, Paardeberg, 45; dam, Black Cloud, 31.
3. J. Featherston & Son, Streetsville, Daisy, 46. Sire, Paardeberg, 45; dam, Black Cloud, 31.

TAMWORTHS.

Barrow, six months and under nine, nine entries.

1. Norman M. Blain, St. George, Si. Sire, Advance, 610; dam, Della, 720.
2. Andrew Elliott, Pond Mill, Pond Mills Sam. Sire, Luther 3rd, 1683; dam, English Lady 2nd, 1734.
3. David Douglas & Sons, Mitchell, Billie. Sire, Ralph, 949; dam, Glanworth Maid, 1494.

Highly Commended,—A. C. Hallman, New Dundee.

Commended,—H. George & Sons Crampton, Harry. Sire, Redfellow 2nd, 1412; dam, Nancy Pond Mills, 194.

Barrow, under six months, nine entries.

1. A. C. Hallman, New Dundee, Surprise. Sire, British King, 942; dam, Oxford Queen, 696.
2. W. R. McDonald, Ridgetown, John. Sire, Ed. Matthews, 1817; dam, May, 1218.
3. Norman M. Blain, St. George, Jim D. Sire, King George, 516; dam, Trilby, 580.

Highly Commended,—W. R. McDonald, Ridgetown,—Joe. Sire, Ed. Mathews, 1817; dam, May, 1218.

Commended, A. Elliott & Son, Galt, Trump. Sire, Sahib, 1310; dam, Dumfries Belle, 1454.

Sow, nine months and under fifteen, seven entries.

1. Norman M. Blain, St. George, Thrifty Maid, 1881. Sire, Rob Roy, 932; dam, Thrifty Girl, 1242.
2. A. Elliott & Son, Galt, Adie, 2023. Sire, Sahib, 1310; dam, O. A. C., 1198.
3. W. M. & J. C. Smith, Fairfield Plains, Parody, 1812. Sire, Five Points, 1502; dam, E. Z., 1463.

Highly Commended,—A. Elliott & Son, Galt, Ada, 1936. Sire, Sahib, 1310; dam, O. A. C., 1198.

Sow, six months and under nine, fifteen entries.

1. A. Elliott & Son, Galt, First Choice, 2025. Sire, Sahib, 1310; dam, Dumfries Lassie, 1455.
2. Andrew Elliott, Pond Mills, Pond Mills Nancy. Sire, Luther 3rd, 1683; English Lady 2nd, 1734.
3. David Douglas & Sons, Mitchell, Sunshine Beauty, 2028. Sire, Ralph, 949; dam, Glanworth Maid, 1494.

Highly Commended, W. R. McDonald, Ridgetown, Concord Jane, 1915. Sire, Ed. Matthews, 1817; dam, Concord Chloe, 1205.

Commended, David Douglas & Sons, Mitchell, Logan Lady, 2026. Sire, Ralph, 949; dam, Glanworth Maid, 1494.

Sow, under six months, nine entries.

1. Norman M. Blain, St. George, Rosy O'Grady, 2019. Sire, King George, 516; dam, Trilby, 580.
2. Norman M. Blain, St. George, Fancy, 2015. Sire, King George, 516; dam, Trilby, 580.
3. J. R. Newell & Sons, Crampton, . Sire, Longfellow, 804; dam, Crampton Queen, 1345.

Highly Commended, A. Elliott & Son, Galt, Belle's Beauty, 1957. Sire, Sahib, 1310; dam, Dumfries Belle, 1454.

Commended, W. R. McDonald, Ridgetown, May Lady, 2034. Sire, Ed. Matthews, 1817; dam, May, 1218.

Three pigs, the offspring of one sow, bred by exhibitor, eight entries.

1. David Douglas & Sons, Mitchell, Billie. Sunshine Beauty, 2058. Logan Lady, 2036.
2. Andrew Elliott, Pond Mills, Pond Mills Bill. Pond Mills Sam. Pond Mills Nancy.
Highly Commended Norman M. Blain, St. George, Leading Lady, 2016. Lovely Lass, 2017. Si.
Commended, A. C. Hallman, New Dundee, Cronje. Bonnie Queen. Nannette.

DUROC JERSEYS.

Barrow, six months and under nine, three entries.

1. W. N. Tape, Bentpath, Tarte. Sire, Jabel, 453 ; dam, Josephine, 369.
2. W. N. Tape, Bentpath, Blair. Sire, Jabel, 453 : dam, Josephine, 369.
3. W. N. Tape, Bentpath, Sidney. Sire, Jabel, 453 ; dam, Josephine, 369.

Barrow, under six months, three entries.

1. W. N. Tape, Bentpath, Abe. Sire, Jabel, 453 ; dam, Adelia, 361.

Sow, nine months and under fifteen, four entries.

1. W. N. Tape, Bentpath, Maud, 459. Sire, Anglo-American, 343 : dam, Janie, 155.
2. W. N. Tape, Bentpath, Mary, 460. Sire, Anglo-American, 343 ; dam, Janie, 155.
3. W. M. & J. C. Smith, Fairfield Plains, Lucy, 458. Sire, Anglo-American, 343 ; dam, Janie, 155.

Sow, six months and under nine, three entries.

1. W. N. Tape, Bentpath, Budget, 455. Sire, Anglo-American, 343 ; dam, Genevieve, 358.
2. W. N. Tape, Bentpath, Judy, 456. Sire, Anglo-American, 343 ; dam, Genevieve, 358.
3. W. N. Tape, Bentpath, Peggy, 457. Sire, Anglo-American, 343 : dam, Genevieve, 358.

Sow, under six months, three entries.

1. W. N. Tape, Bentpath, Maggy, 461. Sire, Anglo-American, 343 ; dam, Jean, 356.
2. W. N. Tape, Bentpath, Fanny, 462. Sire, Anglo American, 343 , dam, Jean, 356.
3. W. N. Tape, Bentpath, Gracie, 463. Sire, Anglo-American, 343 ; dam, Jean, 356.

Three pigs, the offspring of one sow, bred by exhibitor, two entries

1. W. N. Tape, Bentpath, Gracie, 463. Maggy, 461. Fanny, 462.
2. W. N. Tape, Bentpath, Bridget, 465. Judy, 456. Peggy, 457.

Sweepstake.—Best animal in class for Berkshires. Prize ; a plow, donated by the Wilkinson Plow Co., Toronto.

1. George Green, Fairview.

Sweepstake.—Best animal in class for Yorkshires. Prize ; a Spramotor, donated by the Spramotor Co., London, Ont. Value, $10.

1. Brethour & Saunders, Burford.

Sweepstake.—Best animal in class for Chester Whites, four entries. Prize ; five gallons West Chemical Fluid, donated by West Chemical Co., Toronto.

1. H. George & Sons, Crampton.

Sweepstake.—Best animal in class for Poland Chinas, one entry. Prize ; a 30 ft. Waggoner Extension Ladder, and 8 ft. Extension Step Ladder, donated by the Waggoner Ladder Co., London, Ont. Value, $12.50.

Sweepstake.—Best animal in class for Essex, one entry. Prize ; ten barrels of salt, donated by the Windsor Salt Co., Windsor, Ont.

1. J. Featherston & Son., Streetsville.

Sweepstake.—Best animal in class for Tamworths, six entries. Prize ; Cylinder Root Pulper, donated by Massey-Harris Co., Toronto. Value, $15.

1. Norman M. Blain, St. George.

Sweepstake.—Best animal in class for Duroc Jerseys, two entries. Prize ; Winnipeg Heater, donated by the Winnipeg Heater Co., Toronto. Value, $8.

1. W. N. Tape, Bentpath.

GRADES AND CROSSES.

Barrow, six months and under nine, one entry.

1. Robt. Agnew & Sons, Acton, Bones.

Barrow, under six months, six entries.

1. Robt. Agnew & Sons, Acton, Joe.
2. A. Elliott & Son, Galt, Tom. Sire, Sahib, 1310.
3. Norman M. Blain, St. George, Spotted Prince. Sire, Advance, 610.
Highly Commended, Robt. Agnew & Sons, Acton, Tom.
Commended, Rettie Bros., Norwich.

Sow, six months and under nine, five entries.

1. Norman M. Blain, St. George, John's Kind.
2. W. R. McDonald, Ridgetown, Kate.
3. A. Elliott & Son, Galt, Lady. Sire, Sahib, 1310.

Sow, under six months, six entries.

1. Snell & Lyons, Snelgrove, Priscilla.
2. Robt. Agnew & Son, Acton, Rosa.
3. A. Elliott & Son, Galt, Spot. Sire, Sahib, 1310.

Highly Commended, Rettie Bros., Norwich.
Commended. Norman M. Blain, St. George, Late Bird. Sire, Advance, 610

EXPORT BACON HOGS.

Two Berkshires, seven entries.

1. George Green, Fairview, Highclere Duchess, 8168. Highclere Maid, 8167.
2. W. J. Rudd, Eden Mills, Gem, 8173. Joe.
3. James A. Russell, Precious Corners, Grove Bell, 8129. Grove Queen, 8130.

Highly Commended, Snell & Lyons, Snelgrove, Snelgrove Prince. Norval Duke.

Two Yorkshires, nine entries.

1. Brethour & Saunders, Burford, O. L. Cinderella 43rd. O. L. Cinderella 44th.
2. G. B. Hood, Guelph, Guelph Bill. Guelph Billy.
3. J. Featherston & Son, Streetsville, Oxford Boy. Oxford Bill.

Highly Commended, Brethour & Saunders, Burford, O. L. Fashion 10th. O. L. Fashion 11th.
Commended, G. B. Hood, Guelph, Guelph Dick. Guelph Tom.

Two Tamworths, fifteen entries.

1. Norman M. Blain, St. George, Maybe, 2031. Kruger.
2. A. Elliott & Son, Galt, Belle's Beauty, 1937. Belle's Peerless.
3. H. George & Sons, Crampton, Bill. Harry.

Highly Commended, A. Elliott & Son, Galt, Gem's Best. Gem's 2nd.
Commended, Norman M. Blain, St. George, Jim D. Fancy, 2015.

Two Chester Whites, five entries.

1. W. E. Wright. Glanworth. Sire, Jack, 1329 ; dam, Sally, 1422.
2. R. H. Harding, Thorndale.
3. D. DeCourcy, Bornholm.

Two Poland Chinas, three entries.

1. W. M. & J. C. Smith, Fairfield Plains, Fairfield Lina, 1515. Fairfield Molly, 1516.
2. W. M. & J. C. Smith, Fairfield Plains, Elgin Barrow. Ernest Barrow.

Two Duroc Jerseys, three entries.

1. W. N. Tape, Bentpath, Fancy, 462. Jabel.
2. W. N. Tape, Bentpath, Tubal. Tarte.

Two Essex, three entries.

1. J. Featherston & Son, Streetsville, Featherston's No. 1. Featherston's No. 2.
2. J. Featherston & Son, Streetsville, Featherston's No. 3. Featherston's No. 4.

Two Grades or Crosses, seven entries.

1. A. Elliott & Son, Galt, Hebe. Tiber.
2. Rettie Bros., Norwich.
3. Robt. Agnew & Son, Acton.

Highly Commended, Rettie Bros., Norwich.
Commended, Norman M. Blain, St. George, Gummy. Flipps.

Sweepstake,—Two best export bacon hogs, any breed, seventeen entries.

1. Brethour & Saunders, Burford.
2. G. B. Hood, Guelph.
3. J. Featherston & Son, Streetsville, Oxford Boy. Oxford Bill.

Highly Commended, Norman M. Blain, St. George.
Commended, A. Elliott & Son, Galt.

DRESSED CARCASSES.

Two Berkshires, five entries.

1. W. J. Rudd, Eden Mills, Gem. Joe.
2. Snell & Lyons, Snelgrove, Snelgrove Prince. Norval Duke.

Two Yorkshires, seven entries.

1. Brethour & Saunders, Burford, O. L. Cinderella 43rd. O. L. Cinderella 44th,
2. G. B. Hood, Guelph, Guelph Kit, 5168. Guelph Beauty 2nd. 5167.
3. G. B. Hood, Guelph, Guelph Bill. Guelph Billy.

Highly Commended Brethour and Saunders, Burford, O. L. Fashion 10th. O. L. Fashion 11th.
Commended, J. Featherston & Son, Streetsville, Oxford Boy. Oxford Bill.

Two Tamworths, eleven entries.

1. J. R. Newell & Sons, Crampton.
2. H. George & Son, Crampton.
3. A. Elliott & Son, Galt.

Highly Commended, A. Elliott & Son, Galt.
Commended, W. M. & J. C. Smith, Fairfield Plains.

Two Chester Whites, five entries.

1. D. DeCourcy, Bornholm.
2. R. H. Harding, Thorndale.
3. W. E. Wright, Glanworth.

Two Poland Chinas, three entries

1. W. M. & J. C. Smith, Fairfield Plains, Fairfield Lina, 1515. Fairfield Molly, 1516.
2. W. M. & J. C. Smith, Fairfield Plains, Elgin Barrow. Ernest Barrow.

Two Duroc Jerseys, two entries.

1. W. N. Tape, Bentpath
2. W. N. Tape, Bentpath.

Two Essex, three entries.

1. J. Featherston & Son, Streetsville, Featherston's No. 1. Featherston's No. 2.
2. J. Featherston & Son, Streetsville, Featherston's No 3. Featherston's No. 4.

Two Grades or Crosses, five entries.

1. Rettie Bros., Norwich.
2. A. Elliott & Son, Galt.
3. H. George & Sons, Crampton.

Sweepstake.—Two best carcasses, any breed, fifteen entries.

1. Rettie Bros., Norwich.
2. Brethour & Saunders, Burford.
3. J. R. Newell & Sons, Crampton.

Highly Commended, G. B. Hood, Guelph.

Grand Sweepstake.—Best pair swine carcasses, any breed, ten entries.

Prize, Silver Medal, donated by The Canadian Bank of Commerce, Guelph, Ont., J. M. Duff, Manager. Value, $10.

1. Brethour & Saunders, Burford.

Sweepstake.

Two best cows, (36 months and over) of one breed. or both grades of one breed, owned by exhibitor. Prize: A National Cream Separator, donated by the Raymond Manufacturing Co., of Guelph, Limited. Value, $75.

1. Rettie Bros., Norwich, Highland Cornelia, 2529, and Aaltje Posch 4th, 65.

Sweepstake.

Two best heifers (under 36 months) of one breed, or both grades of one breed, owned by exhibitor. Prize: A Reliable Feed Cooker, donated by the Rippley Hardware Co.. Grafton, Ill. Value $45.

1. Rettie Bros., Norwich, Artis Mink Mercedes, 1942, and Alta Posch, 2343.

Special.

The following prizes were offered as Specials by the Canadian Holstein-Freisian Association: for best pure-bred dairy cow, $25; for the next two best Holstein-Freisian dairy cows, registered in the C.H., F.H.B., $15 and $10 respectively.

1. Rettie Bros., Norwich, Highland Cornelia, 2529.
2. Rettie Bros., Norwich, Aaltje Posch 4th, 65.
3. Rettie, Bros., Norwich, Artis Mink Mercedes, 1942.

Extra Special.

The Forest City Business and Shorthand College of London offered a prize a Silver Cup, valued at $50, as a Sweepstake drize for the best cow or heifer exhibited at the Ontario Provincial Winter Fair.

To become the final owner, the exhibitor must win the Cup twice, in succession or on three separate occasions. In 1899 the Cup was won by Messrs. Rettie Bros., Norwich.

1. Rettie Bros,, Norwich, Highland Cornelia. 2529.

DAIRY TEST.

Name of cow and owner's address.	Total lbs. of milk in 48 hours.	Lbs. of fat.	Lbs. solids, not fat.	Points for fat.	Points for solids not fat.	Points for days in milk.	Total points.	Cost of food for 48 hrs. average for 74 days feeding.	Cost of food for 100 points.	1st Test.			2nd Test.			3rd Test.			Lbs. of feed consumed by each cow for 7½ days.							
										Milk.	Per cent. fat test	Amount of fat.	Milk.	Per cent. fat test.	Amount of fat.	Milk.	Per cent. fat test.	Amount of fat.	Clover hay.	Turnips.	Ground oil cake.	Pea meal.	Ground oats.	Ensilage.	Bran.	Herbagum.
Shorthorn Cow, 36 months and over.																										
1. Roan Blanche—25854 ..... A. W. Smith, Maple Lodge.	102.13	3.43	9.47	68.64	37 88	..	106.52	53.2	50.19	34.7	3.	1.04	33.37	3.5	1.2	34.06	3.5	1.19	26.5	20.7	13.	24.5	45.	235.	48.5	....
Ayrshire Cow, 36 months and over.																										
1. Briery Banks Cora—2846 .. N. Dyment, Clappison's Corners.	94.03	3.46	8.31	69.20	33.24	1.3	103.74	29.9	28.8	31.06	3.8	1.18	31.37	3.8	1.12	31.6	3.7	1.16	5.5	43.5	16.5	15.	15.	252.	34.	....
2. Nellie Gray—2057 ..... N. Dyment, Clappison's Corners.	56.19	2.14	4.84	42 8	19.36	10.	72.16	29.3	40.6	17.75	3.6	.64	19.47	4.	.78	18.97	3.8	.72	5.	34.	16.5	14.5	14.	256	35.5	....
3. Jean Armour—2058 ..... Wm. Stewart & Son, Menie.	58.49	2 22	5 30	44.56	21.20	10	75 76	33.1	43.6	19.7	4.	.79	19.87	3.8	.75	18.12	3.8	.68	....	73.5	12.	11.	34.	280.	26.	.33
4 Briery Banks Susie—2847 .. N. Dyment, Clappison's Corners.	48.77	1.8	4.32	36.10	17.28	10.	63.38	27.7	43.7	16.	3.8	.61	16.4	3 6	.59	16.37	3.7	.60	5.5	25.5	14.	11.	14.	260.	38.	....
5. Sprightly—1210 ..... Wm. Stewart & Son, Menie.	58.81	2 35	5.59	47.12	22.36	.5	69.48	33.	47 5	20.6	4.2	.87	19 81	3.8	.75	18.4	4.	.73	....	71.	12.	11.	34.	280.	26.	.33
Ayrshire Cow, under 36 months.																										
1. Gurta Osborne—9066 ..... W.M. & J.C.Smith, Fairfield Plains	49.12	1.98	4.61	39.64	18.44	6.8	64.88	21.8	33.6	16.3	4.	.65	16.6	4.2	.70	16.22	3.9	.63	8.	9.	1.5	.4	18.5	298.	31.	....
2. Angeline—9068 ..... W.M. & J.C.Smith, Fairfield Plains	47.09	1.88	4.32	37.60	17.28	7.6	62.48	21.7	34 7	15.6	4.	.62	15.87	3.9	.62	15.62	4.1	.64	8.	9.	1.5	4.	18.5	291.	31.	....
3. Briery Banks, Lola—9309 ..... N. Dyment, Clappison's Corners.	46.93	1 63	4.28	32.76	17.12	6.4	56.28	28.3	50 3	15.5	3.3	.51	15.9	3.8	.60	15.53	3.4	.52	6.5	36.5	14 5	10.	14.	246.	39.5	....
4. May Mitchell—9237 ..... Wm. Stewart & Son, Menie.	41.27	1 44	4.12	28.80	16.48	10.	55.28	28.6	51.7	14.65	3.3	.48	14.12	3.6	.51	12.5	3.6	.45	....	63.5	12.	11.	30.	206.	21.	.33
Holstein Cow, 36 months and over.																										
1. Highland Cornelia—2529 ..... Rettie Bros., Norwich.	91 94	2 85	7.74	57.	30.96	8.4	96.36	19.3	20.0	30.2	3.	.91	31.4	3.1	.97	30.34	3.2	.97	....	....	5.	....	....	359.	41.	....
2. Aaltje Posch 4th—65 ..... Rettie Bros, Norwich.	114.67	4.28	10.8	185.6	43.24	....	128.84	29.2	22.6	39.37	4.	1.57	37.8	3.6	1.36	37.5	3.6	1.35	5.	12.	13.	22.	1.	277.	51.	....
Holstein Cow, under 36 months.																										
1. Artis Mink Mercedes—1942 ..... Rettie Bros., Norwich.	86.60	2 5	6.90	50.18	27.6	2.1	79.88	19.2	24.0	27.8	3.	.83	29.15	2.8	.82	29.65	3.	.86	....	....	9.	4	....	283.	39.	....
2. Alta Posch—2343 ..... Rettie Bros., Norwich.	84.51	2.45	7.54	49.	30.16	....	79.16	21.8	27.5	28.3	2.6	.74	28.06	3.1	.87	28.15	3.	.84	....	....	11.	11.	....	287.	37.5	....
Grade Cow, 36 months and over.																										
1. Utopia, A. McDougal, Guelph. ..	101 27	3.38	8.80	67.7	35.2	.6	103.5	.36.	34.7	33.93	3.3	1.12	36.	3.4	1.2	31.94	3.4	1.06	24.5	10.6	2.	23.5	52.	240	....	...

REPORT

OF THE

REGISTRAR OF LIVE STOCK

OF THE

PROVINCE OF ONTARIO

1900.

DOMINION SHORT-HORN BREEDERS' ASSOCIATION.
CANADIAN AYRSHIRE BREEDERS' ASSOCIATION.
HEREFORD BREEDERS' ASSOCIATION.
HACKNEY HORSE SOCIETY.
CLYDESDALE HORSE BREEDERS' ASSOCIATION.
SHIRE HORSE BREEDERS' ASSOCIATION.
CANADIAN HORSE BREEDERS' ASSOCIATION.

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

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1901.

WARWICK BRO'S & RUTTER, PRINTERS AND BOOKBINDERS.
TORONTO.

ANNUAL REPORT

OF THE

REGISTRAR OF LIVE STOCK.

To the Honorable the Minister of Agriculture:

I have the honor to present to you the Reports of the following Live Stock Associations for the year 1900:

DOMINION SHORTHORN BREEDERS' ASSOCIATION.

DOMINION AYRSHIRE BREEDERS' ASSOCIATION.

HEREFORD BREEDERS' ASSOCIATION.

HACKNEY HORSE SOCIETY.

CLYDESDALE HORSE BREEDERS' ASSOCIATION.

SHIRE HORSE BREEDERS' ASSOCIATION.

I also append the Report of the CANADIAN HORSE BREEDERS' ASSOCIATION.

Your obedient servant,

HENRY WADE,
Registrar of Live Stock.

TORONTO, March, 1901.

DOMINION SHORT-HORN BREEDERS' ASSOCIATION.

OFFICERS FOR 1901.

President: Robert Miller, Stouffville, Ont.

First Vice-President: William Linton, Aurora, Ont.

Second Vice-President: W. G. Pettit, Freeman, Ont.

Ex-Presidents—Life Members:

Hon. John Dryden, Brooklin, Ont.
A. Johnston, Greenwood, Ont.
Richard Gibson, Delaware, Ont.
James Russell, Richmond Hill.

Honorary Life Members:

Hon. M. H. Cochrane, Hillhurst, Que.; John Miller, Brougham, Ont.; Jas. I. Davidson, Balsam, Ont.

Vice-Presidents from Provinces:

A. W. Smith, Maple Lodge, Ont.
F. G. Bovyer, Georgetown, P.E.I.
W. H. Ladner, Ladner's Landing, B.C.
Jas. A. Cochrane, Hillhurst, Que.
Geo. A. Fawcett, Sackville, N.B.
R. A. Wallace, High River, Alta.
C. A. Archibald, Truro, N.S.
W. A. Heubach, Touchwood Hills, Assa.
J. E. Smith, Brandon, Man.

Board of Directors:

A. List.	C. List.	B. List.
Jas. M. Gardhouse, Highfield.	W. G. Cargill, Cargill.	W. J. Biggins, Clinton.
T. E. Robson, M.P.P, Ilderton.	N. Dyment, Barrie.	Wm. B. Watt, Salem.
Edward Jeffs, Bond Head.	John Isaac, Markham.	Jas. Tolton, Walkerton.
H. Smith, Hay.	Geo. Raikes, Barrie.	W. D. Flatt, Hamilton.
Thos. Russell, Exeter.	C. M. Simmons, Ivan.	John Davidson, Ashburn.

Executive and Finance Committee: Robert Miller, Stouffville, Ont.; W. D. Flatt, Hamilton, Ont.; H. Smith, Hay, Ont.; Arthur Johnston, Greenwood, Ont.; W. G. Pettit, Freeman.

Delegates to Dominion Cattle Breeders' Association: Arthur Johnston, Greenwood, Ont.; T. E. Robson, M.P.P., Ilderton, Ont.

Delegates to Industrial Exhibition: Hon. John Dryden, Brooklin, Ont.; Robert Miller, Stouffville, Ont.

Delegates to Western Fair: Henry Smith, Hay, Ont.; C. M. Simmons, Ivan, Ont.

Delegates to Central Fair, Ottawa: R. R. Sangster, Lancaster, Ont.; D. McLaren, Dunmore, Ont.

Delegates to Provincial Exhibition, Nova Scotia: C. W. Holmes, Amherst, N.S.; F. C. Dickie, Fort William, N.S.

Delegates to Provincial Exhibition, New Brunswick: Senator Josiah Wood, Sackville, N.B.; Geo. A. Fawcett, Sackville, N.B.

Delegates to Provincial Exhibition, Prince Edward Island: C. C. Gardiner, Charlottetown, P.E.I.; F. G. Bovyer, Georgetown, P.E.I.

Delegates to Winnipeg Industrial Exhibition: Hon. Thos. Greenway, Crystal City, Man.; W. S. Lister, Middle Church, Man.

Secretary and Editor (to whom all communications are to be sent): Henry Wade, Parliament Buildings, Toronto.

DIRECTORS' MEETING.

The fifteenth annual meeting of the Directors of the Dominion Short-Horn Breeders' Association was held in the City Hall, Guelph, on February 27th, 1901, at 7:30 p. m.

Vice-President MILLER, on calling the meeting to order, asked the Secretary to read the minutes of the last annual meeting, and the Executive Meetings, but on motion of Jas. Tolton, seconded by W. J. Biggins, they were adopted as having been read.

The SECRETARY then presented his Annual Report, and after a few questions had been asked regarding different items in the financial statement, it was moved by Arthur Johnston, seconded by W. J. Biggins, "That as the report is entirely satisfactory it be adopted." Carried unanimously.

The matter of grants to the different Provincial exhibitions in the Dominion was carefully considered, and a resolution, stating the amounts to be donated to each exhibition, was drawn up to be submitted to the annual meeting for approval.

Mr. WADE stated that one of the Directors had suggested to him that two classes should be made for yearlings at the Toronto Industrial Exhibition, and he was of the opinion this was a good idea, as it had worked admirably at the National Live Stock Show at Chicago. Mr. A. W. SMITH was in favor of the suggestion, as well as the majority of the members.

At this juncture a deputation from the Guelph Fat Stock Club waited on the Board, and invited the members to a banquet given to Mr. Jas Millar, at 9 p. m , and on motion of Capt. ROBSON, seconded by A. SMITH, it was resolved : "That we accept the kind invitation to dine with the members of the Fat Stock Club to-night."

The next matter that came before the meeting was that of making all the members, resident in Ontario, members of the Dominion Cattle Breeders' Association, and a resolution was framed to be presented at the annual meeting.

Mr. WADE then read a letter from the Secretary of the American Short-Horn Breeders' Association, asking that the Association act in conjunction with theirs in sending representatives to England to try and induce the Short-Horn Society of Great Britain and Ireland to make a more complete index for their Herd Book and to discontinue recording animals whose dams were not on record.

A letter was also read from G. DeWarren Green, stating that he intended going to England this summer, and would be pleased to act as a representative from this Association should they desire him to do so.

A short discussion arose as to whether the English Herd Book people would make a change in their book or not.

Mr. FLATT thought this an opportune time to present a memorial from our Association to get them to make a change, as Mr. Duthie, one of the principal men over there, was very favorably disposed as to bringing about some amicable arrangement.

Mr. CARGILL was of the opinion the matter was of very great importance, as any person who had anything to do with English Herd Books knew how long it took to find the pedigree of any animal, with the present index. He thought if a change was not made in time to benefit the breeders of the present, our friends who would come after us a hundred years from now would feel very grateful to their ancestors for inducing the English people to register their females at least. He had undertaken to look up pedigrees in the English Herd Books, but he had made up his mind that life was too short to spend the time it requires at that sort of business, so he always employed some person else.

Mr. MILLER : We should do something in this matter now, because, as Mr Flatt has explained to you, there is a feeling on the part of at least one of the Board in Great Britain that this should be done, and it cannot be done too quickly, as I believe there are one or two more members besides Mr. Duthie in favor of something being done. When Mr. Mills was elected on that Board, as he told me, he was very much in favor of this change being brought about in some way at least. Last year your Association wrote that Association that there were representatives of this Association in the old country pleased to meet them at the Royal Show, and I believe Mr. Wade mentioned my name, but I did not receive the notice which was sent me. Mr. Mills came to me and asked if I had any

authority. I said I had no authority. "Well," he said, "I would give you authority if you were in favor of your Association and the American Association accepting our books and all our pedigrees just as they are." I said, "You will not need to give that authority to me." "Well," he said, "You cannot come to our meeting as a representative." He went to look for Mr. Johnston, but he was not there in time for the meeting. Mr. Cargill put this in the proper form when he said the people coming after us would be glad we had done this. We are certainly all here working in the interests of Short-Horn cattle, and this is only one step in that direction. We want to get Coates' Herd Book closed to all cattle that have only four or five crosses. Perhaps it will not be within ten years, perhaps not within twenty, but it will become more difficult each year we postpone trying to do something. Now if we go and make a joint request of them, as we are prepared to do—because we have authority from the Short Horn Associations to make that request—if we go and make that request jointly we might make some progress in the matter; and I can assure you some day it will be worth a great deal to the Short-Horn breeders and Short-Horn breed of cattle if we have these books on the same standard.

Mr. RICHARD GIBSON: I move that Mr. Green's request be accepted. I think it might be left in the hands of the Executive Committee to make some arrangements and give him proper authority or vouchers to confer with the people over there; but I do not think you will ever succeed. I am a life member of the Short-Horn Society of Great Britain and Ireland, and have been for a great many years. I get the voting papers every year. Now you must be aware that the English people will not register anything there until it has produced a living calf, and the question is: Are you prepared to adopt their system, that no female shall be on record unless she has produced a live calf? While I am in favor of Mr. Green trying to do something I think very little will be accomplished.

Mr. PETTIT: I discussed this matter with them over there, and from what I can learn they are willing to discontinue admitting more than four cross pedigrees. There are a great many of their females not recorded when they produce I found that out last winter. I sent several cattle to the States, and a number of their dams were not recorded, and I had to put up $1.000 duty, and that was the fault of the English breeders not having these pedigrees recorded when they should have been. There are a great many females recorded there that should have been recorded long ago. In fact, they do not record nearly all the pedigrees.

Mr. MILLER: Some animals have five or six dams not recorded.

A number of resolutions were then drawn up to be presented at the annual meeting, for the approval of the members, which are incorporated in the minutes of that meeting.

The meeting then adjourned.

ANNUAL MEETING.

The fifteenth annual meeting of the Dominion Shorthorn Breeders' Association was held in the City Hall, Guelph, on February 28th, 1901, at 11 a.m., and was largely attended.

ADDRESS.

BY ROBERT MILLER, STOUFFVILLE.

It is a very sad thing to me, as I feel it is to every member of this Association, that it is necessary for me to take the chair in place of your late President. We have sustained a great loss in the death of Mr. Hobson, and I am sure we all feel it deeply. I think, perhaps, that no Association ever had at its head a man who was more willing to unselfishly devote his best interests on behalf of the Association than our late President. All that is necessary for me to say is, that I believe, and I am sure every member of this Association believes, that the late Mr. Hobson, was in his happiest element when he was doing good for some other people. I am sure you will agree with me that we sustained a sad loss, and it would be quite proper for some gentleman to draw up a resolution, which, afterwards, could be submitted to those most dear to him who were left behind.

I am very pleased, however, to see so many members of the Association here to-day. I am very pleased to see among the people gathered here together a great many members that do not usually attend the annual meetings; that is a good sign as we like everybody to take an interest in the affairs of the Association. And I might just make a remark in regard to the invitations sent out, because there were two invitations—the last one being rather an urgent one. We expected that very important business would have to be transacted by this meeting. We have hopes now that the matter, which we thought at that time would have to be discussed, will perhaps not have to be taken up by us; we hope everything is being done, which we thought should be done, with regard to having the little embargo removed which now exists between the United States and Canada, so it will not be necessary for us to do anything at this meeting.

I wish, also, to congratulate you on the continued prosperity of this Association. Our business has been as good, perhaps, in the past year as ever it has been before; and the business of the Association, as carried on in the offices, has prospered in accordance with the prosperity that has existed among the Short-Horn breeders in their business. You will notice, when the financial statement is read, that there appears to be a rather less amount of money on hand than there was a year ago. We paid out more in prize money, paid more for the expenses of a deputation sent out to the different Provinces on work in connection with the Association, and on one or two occasions to Ottawa and Montreal, I believe, and we have expended a little more in other directions; but while we spent a little more in that way we thought we were doing it for the good of the cause. And I am also in a position to be able to state to you that any shortage apparently existing in the financial statement now compared with one year ago is made up by increased income of this Association during the last two months. So if the statement given was dated the 28th of February it would show we have more money on hand now than one year ago. We propose to increase to some extent, as will be shown to you, the prize money grants, which will be a matter for your consideration. I shall now ask the Secretary to read the minutes of the last meeting, and the work of the Board of Directors will be placed before you for your ratification, or otherwise, later in the meeting.

Moved by W. G. PETTIT, seconded by Jas. TOLTON, "That the minutes of the last meeting be taken as read." Carried.

REPORT OF SECRETARY AND EXECUTIVE COMMITTEE.

The Executive Committee beg to present the fifteenth annual report of business done by this Association, for the year ending 31st December, 1900.

Registrations have steadily increased for the last four years, this being the banner year. Volume XVI. has been issued in two parts, one for bulls, containing 3,214; one for cows, containing 3,810; or a total of 7,024; or 1,284 more than in Volume XV. In Volume XVI. will be found the list of animals that prizes have been awarded to in Toronto, London, Ottawa, Winnipeg, Man.; St Johns, N. B; Halifax, N. S.; Sherbrooke, Que.; New Westminster, B. C.; Calgary, Alta.; Saskatoon, Sask.; and at the Provincial Fat Stock Show held at Guelph.

The using of some of our surplus by awarding prizes at several exhibitions of a provincial nature, as agreed on at the last annual meeting, has again been done, and the sum of $2,550 has been paid out, against $2,075 last year. Winnipeg, Man., was paid $500; Brandon, Man., $175; Toronto, $750; London, $200; Ottawa, $100; Sherbrooke, Que., $100; St. Johns, N. B., $50, Halifax, N. S, $50; Charlottetown, P E. I., $50; Saskatoon, Sask., $25; Calgary, Alta., $25; New Westminster, B. C., $50; Provincial Fat Stock Show, Guelph, $475.

It was thought advisable by the Executive Committee, on the solicitation of the Live Stock Commissioner, as an experiment, to make the Ontario members of this Association members of the Dominion Cattle Breeders' Association, paying from our funds the sum of 50 cents per head (this amounted to $475), the money to be used for prizes at the winter show and to be under the control of this Committee, to be apportioned as was thought advisable.

Your Committee thought it advisable to send a small delegation down to the Maritime Provinces to visit the various Provincial Exhibitions, and try to get the Governments of Nova Scotia and New Brunswick to give up their claim to their respective Short-Horn Herd Books; also to see the principal breeders and interest them in the same subject. They were very successful.

The importation of cattle has also increased this year, the following gentlemen, namely: H. Cargill & Sons, Cargill; James A. Crerar, Shakespeare, Ont.: W. C. Edwards & Co., Rockland, Ont.; W. D. Flatt, Hamilton, Ont.; Alex. Isaac, Markham, Ont.; George Isaac, Bomanton, Ont.; John Isaac, Markham, Ont.; Arthur Johnston, Greenwood, Ont.; Wm. Linton, Aurora, Ont.; Robert Miller, Stouffville, Ont.; R. Mitchell & Son, Nelson, Ont.; Hon. Wm. Mulock, Aurora, Ont.; R. & S. Nicholson, Sylvan, Ont.; W. G. Pettit, Freeman, Ont.; Chas. Rankin, Wyebridge, Ont.; Thomas Russell, Exeter, Ont., have together brought out 115 bulls and 343 cows.

The office work has also increased very largely—over 15,000 letters having been sent out, also 1,251 membership receipts.

Your Committee having had their attention called to a shipment of Short-Horn cattle taken up to Manitoba by one A. C. Smith, formerly of Hagersville, now said to be of Carman, Man., find upon examination that two of the bulls, namely Ringleader Second =27201= and Samson =27284=, both recorded by A. C. Smith, were pronounced forgeries, and at once cancelled. Mr. A. C. Smith was also expelled from the Association.

Two very notable auction sales have been held during the year that have been record breakers; one by Mr. W. D. Flatt, in Chicago, at which the average for 59 head was $793.40; the highest $2,600; the lowest, $275. The other sale was by Mr. John Isaac, at his home at Markham, where 52 head averaged $421. There have been many other good sales, both public and private, at which prices have been very satisfactory.

Many of the breeders write to know why females are not numbered the same as males, and often return certificates to have them numbered. The explanation is simple. Pedigrees of females are all printed alphabetically under their owners' names which are also in the Herd Book. If breeders sent in their registrations at different times during the year the numbers of their cows would be all mixed up and would cause great confusion; hence we cannot number them consecutively until the volume is completed.

All pedigrees shall be signed by the breeder, or in case of death, by a proper representative. The breeder of an animal is the owner of the dam at the time of service.

In 1898 the annual fees were reduced to $2.00 per annum, which has resulted in a very large increase in membership, consequently circulating more of the Herd Books amongst the Breeders. The penalty fees have also been reduced—to members, from $1.75 to $1.00; and for non-members, from $2.25 to $1.75. The time limit was changed, in 1897, to two years, instead of eighteen months.

A list of errors, called an Errata, is made in each Volume, which should be marked in red ink in the Volume mentioned. We also hope breeders will furnish us with any catalogues of sales that may be made during the year.

Your Committee would call particular attention to the rule requiring all calves born to be recorded before they are twenty four months old. A penalty fee will be charged after that age. Attention is also called to the clause of the Constitution which requires that "a member must pay up all his fees in arrears before he can resign"; and to another clause, "That when books and documents are mailed, properly prepaid, the duties of the Association are fulfilled, and should a volume or pedigree be lost in the mail, duplicate copies will have to be paid for."

While the Association's business transactions have been satisfactory to every one, it has met with a sore and grevious loss in the death of its esteemed President, John I. Hobson, of Guelph—a straightforward and progressive man, well fitted for the position. He literally died in harness, as the last business he ever did was to sign a few cheques in the Toronto office. Several other deaths have also occurred amongst the members of this Association during the past year. We have also, with deep regret, learned of the death of J. H. Pickrell, the Secretary of the American Short-Horn Breeders' Association.

Registrations.—In 1900 we were paid for 7,990 registrations and 3,397 changes of ownership and duplicate certificates; against in 1899, 7,068 registrations and 2,006 changes of ownership and duplicate certificates; against, in 1898, 5,386 registrations, 5,555 certifi-

cates, and 1,064 changes of ownership; against, in 1897, 4,128 registrations, 4, 246 certificates, and 620 changes of ownership; against, in 1896, 2,957 registrations, 3,017 certificates, and 379 changes of ownership; against, in 1895, 3,000 registrations, 3,100 certificates, and 450 changes of ownership; against, in 1894, 3,045 registrations, 3,142 certificates, and 493 transfers.

Registration Fees.—Following up the change in registrations, as a matter of course, there is a corresponding change in registration fees. In 1891 we received $3,152.50; in 1892, $3,835.25; in 1893, $3,787 45; in 1894, $3,357.75; in 1895, $3,222.00; in 1896, $2, 954.00; in 1897, $4,124 25; in 1898, $5,233 00; in 1899, $6,834.75; and in 1900, $7,953.00; an increase of $1,118 25 over 1899.

Herd Books.—There were sent out in 1900: Of Vol. I, 2 copies; of Vol. II, 5 copies; of Vol. III, 15 copies; of Vol. IV, 19 copies: of Vol. V, 29 copies; of Vol. VI, 39 copies; of Vol. VII, 59 copies; of Vol. VIII, 60 copies; of Vol. IX, 76 copies; of Vol. X, 97 copies; of Vol. XI, 95 copies; of Vol. XII, 101 copies; of Vol. XIII, 136 copies; of Vol. XIV, 177 copies; of Vol. XV, 309 copies; of Vol. XVI, 149 copies; a total of 1345 copies, or 188 more than for 1899.

Pedigrees on Record.

Volume I. contains	3,304	Volume X. "	3,669
" II. "	4,427	" XI. "	3,213
" III. "	4,593	" XII. "	3,148
" IV. "	4,957	" XIII. "	2,714
" V. "	4,388	" XIV. "	4,147
" VI. "	5,904	" XV. "	5,776
" VII. "	4,954	" XVI. "	7,024
" VIII. "	4,724	" XVII will contain about	8,000
" IX. "	3,633		149,845

As shown by the above table, we are now recording for the Eighteenth Volume, which will contain animals recorded in 1901.

Number of Members from Inception to date.

	New Paid.	Resigned and Lapsed.	Not Paid.	Old Paid.	Total Paid.
B. A., 1882	164	..	..	164	164
" 1883	73	..	..	164	237
" 1884	42	..	..	173	215
" 1885	39	..	..	187	220
Dom. S. H. B. Assc., 1886	215	37	8	195	410
" " " 1887	80	54	81	357	437
" " " 1888	46	79	69	388	434
" " " 1889	36	37	91	398	434
" " " 1890	29	33	74	405	434
" " " 1891	32	67	59	365	397
" " " 1892	60	22	47	398	458
" " " 1893	49	38	72	349	398
" " " 1894	66	72	88	318	384
" " " 1895	60		..	290	350
" " " 1896	109	41	77	315	424
" " " 1897	106	36	50	431	537
" " " 1898	250	24	48	463	713
" " " 1899	399	31	83	657	1,056
" " " 1900	305	64	142	946	1,251

This table shows that our paid up membership roll has increased 195 in the last year in total numbers. Our income from members' fees for 1896 was $1,289; for 1897, $1,615; for 1898, $1,536; for 1899, $2,112; for 1900, $2,502.

Financial Statement.

Receipts.

Cash on hand, Jan. 1, 1900	$8,513 92
946 Yearly Subscribers	1,892 00
305 New Subscribers	610 00
Registration Fees and Pedigrees, 7,990; Transfers, 3,397	7,973 00
Interest on deposit	312 08
Herd Books (60)	120 00
Returned Prize Money	10 00
	$19,431 00

Expenditure.

By Testimonial, National Live Stock, etc.	$99 00
Insurance	32 40
Printing and Stationery	382 95
Postage	584 67
Auditor and Stenographer	60 00
Miscellaneous, Telegraph, Cartage, etc	32 45
Herd Books, Binding	861 48
Herd Books, Vol. XVI., Printing	2,753 16
Prizes at different Shows	2,075 00
Cattle Breeders' Ass'n Grant for Prizes	475 00
Commission and Committee Expenses	3,890 45
Cash on hand, Dec. 31, 1900	8,220 44
	$19,431 00

Assets.

To Cash	$8,220 49
Office Furniture, Books, etc	150 00
Vol. I. D. H. B., 105 copies	157 50
" II. " 229 "	343 00
" III. " 336 "	504 00
" IV. " 319 "	478 50
" V. " 260 "	390 00
" VI. " 196 "	294 00
" VII. " 140 "	210 00
" VIII. " 82 "	123 00
" IX " 79 "	118 50
" X. " 256 "	384 00
" XI. " 409 "	613 50
" XII. " 404 "	606 00
" XIII. " 406 "	609 00
" XIV. " 419 "	628 50
" XV. " 541 "	1,082 00
" XVI. " 1351 "	2,702 00
	$17,614 44

Liabilities.

By Balance	$17,614 44
	$17,614 44

I hereby certify that I have examined the books and accounts of the Dominion Short-Horn Breeders' Association for the year ending December 31st, 1900, and that the above statement is in accordance with the same.

Chas. F. Complin, Auditor.

Toronto, January 17th, 1901.

Extracts from By-Laws.

Section 1.—Persons desirous of becoming members shall so notify the Secretary, pay the entrance fee, and agree, if elected, to conform to the rules of the Association, and not to withdraw without paying all fees due and giving three months' notice of their intention of doing so.

Section 2.—Members shall pay an entrance fee of $2.00, and subsequently an annual subscription of $2 00, which annual subscription shall be due and payable on the first of January of each year.

Section 3.—Members must keep the Secretary advised of their post-office address, and all *communications* shall be considered as delivered which have been mailed, properly addressed and prepaid.

New By-Law.—That all calves dropped after January 1st, 1889, shall in future be registered within twenty four months of birth, and if not so registered, enlarged fees shall be charged for their registration.

SECTION 15—FEES.—Charges for registration will be:

To Members, Registration and Certificate	$0	75	for each animal.
To Non-members, Registration and Certificate	1	25	" "
Over age, to Members (in all cases a Certificate goes with Registration)	1	00	" "
Over age, to Non-Members (in all cases a Certificate goes with Registration)	1	75	" "

Change of Ownership, 25c.; duplicate Certificate, 25c.
Back volumes of Herd Books, $2.00 each.

HENRY WADE, Secretary.

Moved by A. SMITH, seconded by W. G. BIGGINS, that the Secretary-Treasurer's report, as read, be adopted. Carried.

SHORT-HORNS AT THE PAN-AMERICAN.

Mr. F. W HODSON, Commissioner of Live Stock, Ottawa, was present on behalf of the Dominion Government, and laid before the meeting proposals for an exhibit of Canadian animals. He also referred to the tuberculin test as practised in the Canadian Northwest, and said he was hopeful that in the very near future trouble with the Washington Government in regard to this question would be at an end. In any event there would be no quarantine regulations touching animals going to the Pan-American. The exhibition would be bonded, and the animals sent from Canada would be sent and returned free from quarantine. Mr. Hodson urged the entering of five well-selected Short-Horns in the dairy contest.

Mr. FLATT: I think we should take some action here, or try and get some of our breeders to contribute these cattle. If I knew where I could get two or three good dairy short-Horns, I would be prepared to give a good figure for them. Of course, the animals shown over in Buffalo for the dairy test would have to be from herds where the calves were not allowed to nurse the dams. If Short-Horns did well at that test I think it would be a good thing for the country in general. I understand there will be three different prizes: one for the greatest net profit of butter; one for the greatest net profit of total solids, and one for the greatest profit of solids not fat.

Mr. HODSON: I am glad to hear what Mr. Flatt says.

Mr. MILLER: If any gentlemen who have real good milking cows kindly report to the Secretary, and when the proper time comes we will have these matters investigated and try and select five of the best cows. If it is necessary—I am sure you will agree with me—if it is necessary for the Short Horn Association to go to any expense to find out where the best cows are in this country, we will be justified in doing that. If you would not agree to that I would be willing to spend some of my own money for the good of the cause. I would suggest that in all cases where Short Horns or any other breed of cattle enter into competition they should take into consideration the improvement in weight the time of the test, or the shrinkage Mr. Hodson tells me they propose to value every pound of gain or every pound of loss at three cents per pound. Perhaps that would be quite a proper valuation, but I think perhaps a little more than that would be in our favor. We think that a pound of beef of a Short-Horn cow is worth more than three cents, while perhaps if it were a pound on some other breeds it would not be worth more than three cents. I think this a very fair proposition, and I believe we have cows in this Short Horn breed that if they met any other breeds on this footing we will come out very often the best after the test is over.

Mr. HODSON: If a man has a valuable cow and does not want to sell her, we are quite willing to pay the expenses of a valuable bull to serve her; but I advise you not to, as they do not milk as well.

A short discussion arose as to when the ages of animals exhibiting should be reckoned, and on motion of W. D. FLATT, seconded by JAS. RUSSELL, it was resolved: "That we ask the Pan-American Exposition authorities to make Sept. 1st the date from which the ages count at the Pan-American Exposition."

RESOLUTIONS DRAWN UP AT THE DIRECTORS' MEETING, FOR APPROVAL AT ANNUAL MEETING.

Moved by W. G. PETTIT, seconded by RICHARD GIBSON, "That the Dominion Short-Horn Breeders' Association make each member, resident in Ontario, a member of the Dominion Cattle Breeders' Association on payment by the Association of 50c per member; this amount to include the donation to the Provincial Winter Fair, and the whole sum to be given as prizes at that exhibition. Also, that two representatives be appointed to act on the Board of the Cattle Breeders' Association, and the adjudication of the prize money to be left in the hands of the Executive Committee." Carried.

Moved by W. G. PETTIT, seconded by JAS TOLTON, "That it be left in the hands of the Executive Committee to endow Mr. G. DeWarren Green, the President, or any other member of the Association who may be going to England next summer, with power to act in conjunction with representatives from the American Short-Horn Association, and confer with members of the Short-Horn Society of Great Britain and Ireland, with a view of inducing them to record in the future all their dams, compile a more suitable index for their Herd Book, and to discontinue recording Short-Horns whose dams are not already recorded." Carried.

On motion of ALEX. SMITH, seconded by T. E. ROBSON, M.P.P, it was resolved: "That the Dominion Short-Horn Breeders' Association grant the amounts, as given below, from the funds of their Association towards the prize lists of the different exhibitions, on condition that each Fair Board Association grants the same amount for Short-Horn prizes; or, in the event of any exhibitions not giving the same amount the amount donated by this Association be the same as the sum granted by said Exhibition Associations, but they must, however, give as much for Short-Horns as for any other breed. Competition to be open to Canada or the United States, and all animals exhibiting must be recorded in the Dominion Short-Horn Herd Book." Carried.

Toronto, $1,000; London, $500; Winnipeg, $500; Brandon, Man., $250; Ottawa, $100; Sherbrooke, Que., $100; Halifax, N.S., $100; St. John, N.B, $100; Charlottetown, P.E.I., 100? New Westminster, B.C., $100; Calgary, Alta., $25; Saskatoon, Sask., $25; Assiniboia, $25.

A discussion arose as to the advisability of giving large amounts to certain large exhibitions instead of dividing it up among the smaller fairs

Mr J. C. HANLEY was of the opinion that a certain portion of the grant should be devoted to small county fairs, as it would induce the smaller breeders to bring out their animals. He also thought it would be to the benefit of Short-Horn interests to send delegates from this Association to the county fairs, who could also act as judges, as there were a great many incapable judges at the small exhibitions.

Mr. ARTHUR JOHNSTON rather favored increasing the grant to Toronto Exhibition. He contended they required a grand prize list this year at the Industrial for the simple reason there would be greater inducements in the States at the Pan-American than in Canada, and they required to induce their best men to retain and exhibit their animals there after they had exhibited them at Toronto, as it would be of great value to Canada as well as to the owners of the live stock should they go over and win at the Pan-American instead of selling to the Americans and allowing them to win; and in order to keep the animals here they must make some inducement in the way of offering good prizes.

Mr. RAIKES thought a certain portion of the money in the treasury could be well expended in giving grants to Electoral District Societies, but this opinion did not meet the general approval of the meeting.

Mr. JAS. BOULTER said he was in symathy and in touch with the amounts granted, and if it were possible, he thought the grant to Toronto should be increased as a great number of visitors would no doubt come over from the Pan-American, and a large exhibition of good Short-Horns would greatly advertise Canada as the country where the Americans could get the right type of animal they wanted.

Mr. JAS RUSSELL was also in favor of increasing the grant to Toronto if the Industrial Association would grant a like amount. He also thought that prizes awarded should be for breeders of animals, that is for animals bred and exhibited by the same man.

Mr. W. D. FLATT said if he had to comply with Mr. Russell's suggestion he could not exhibit. Continuing he said; "Now I am only a new man in the Short-Horn business; I am trying to put together a herd that will win in Canada and win in the United

States. I am expending a great amount of money and I think it would be an injustice to try and debar a man from exhibiting who is trying to do all he can for the Short-Horn interests by giving good prices for the best in order to show them and let the visitors from the other side see what we have when they come here. The Americans are our best customers; for although I am glad to have any Canadian gentlemen come to my farm and buy, yet, we cannot get the prices here we can from the Americans, and for this reason I sell the most of my stock to go to the States. And does it not help the smaller breeder here if I go and pay $100 or $500 for an animal?

Mr. W. G. CARGILL said there was nothing to prevent the small breeder from wining from any person providing he had better animals; but he did not think prizes awarded should be restricted to breeders only.

Mr. A. JOHNSTON said Mr. Rankin, through Mr. Flatt's enterprise, produced one of the best cows in United States. He said if he could not show he could sell to Mr. Russell, who at one time did him great credit by winning with an animal he had previously owned.

On motion, it was resolved: "That the Dominion Short-Horn Breeders' Association, in annual meeting assembled, desire to express their profound sorrow at the death of their late President, Mr. John I. Hobson, who was for so many years such an ardent worker in everything that tended to promote the interests of Short-Horn breeders. His kindly manner endeared him to all the members of the Association, and, in his death, each member feels that he has sustained the loss of a personal friend. We, therefore, wish to convey to you and your family our sincerest sympathy in your sad bereavement."

Several members also expressed their regret at the death of Mr. A. J. Pickrell, Secretary of the American Short-Horn Breeders' Association, as he had been an ardent worker for the furtherance of Short-Horn interests, and on motion of ARTHUR JOHNSTON, seconded by WILLIAM LINTON, it was resolved: "That Messrs. Miller, Gibson, and the Secretary be a committee to frame a resolution of condolence on the death of the late J. H. Pickrell and forward it to his widow,

Moved by R. GIBSON, seconded by JAS. GARDHOUSE, "That a resolution of condolence be written in connection with the death of several of our members during the past year, and that a copy be forwarded to each family." Carried.

On motion of MAJOR MCGILLIVRAY, seconded by ALEX. SMITH, it was resolved: "That the sense of appreciation of this meeting be conveyed to the Minister under whose direction, with the assistance, courtesy and attention received from the representative, Mr. Hodson, and others, this sale has been conducted; and that the Secretary be instructed to forward a copy to the Hon. Mr Fisher."

Moved by WILLIAM LINTON, seconded by MAJOR MCGILLIVRAY, "That we, the members of the Dominion Short-Horn Breeders' Association, feel that Mr. Robert Miller has sustained a great loss through the slaughter of thirteen animals imported by him in 1898. We believe that they were imported by him in good faith, believing that he had complied with the requirements of the law; and we hereby request that the Dominion Government pay him the cost of said animals and expenses connected therewith." This resolution was unanimously adopted by over two hundred members present.

Mr. ROBERT MILLER: I imported these animals concientiously believing I was complying with every requriement of the law. I wrote to the High Commissioner and he replied, stating that a man had been appointed to examine the cattle, and this test would be accepted by the Canadian Government after I reached here without the cattle being subject to a re-test. I have that letter now from the High Commissioner. After the cattle had been tested over there I took those that were sound and left the ones that were rejected; but to my surprize, when I reached Quebec I was told the charts were not satisfactory. I was told they would have to be tested again, and they were tested and re-tested, and finally the cattle were slaughtered, and a report has not even been made to me what the results of that examination was after they were slaughtered. That is the exact condition. I am sure I feel very grateful for the members of this Association voting for it the way you have.

On motion it was resolved: That the thanks of this Association be extended to the Mayor and City Council of Guelph for the courtesy they have shown in granting the use of the City Hall for the annual meeting.

The meeting then adjourned.

PRIZE-WINNING SHORT-HORNS AT THE TORONTO INDUSTRIAL, 1900.

Bull, Four Years Old and Upwards.

1st, Charles Dickens=23418=; red and white; calved December 19th, 1895. Bred by exhibitors; sire, Royal Sailor (imp.)=18959=; dam, Aberdeen Lady 6th=14290. Exhibitors, J. & W. B. Watt, Salem, Ont.
2nd, Duncan Stanley=16364=; roan; calved March 15th, 1891. Bred by exhibitors; sire, Stanley=7949=; dam, Isabella 14th=13944=. Exhibitors, J. & W. Russell, Richmond Hill, Ont.
3rd, Beau Ideal=22554=; red; calved January 9th, 1895. Bred by J. Miller & Sons, Brougham, Ont.; sire, Sittyton Stamp (imp.)=18963=; dam, Bessie Lass (imp.)=24824=. Exhibitors, Wm. Grainger & Son, Londesboro, Ont.

Bull, Two Years Old and Under Three.

1st, Captain Mayfly (imp.)=28858=; red; calved February 20th, 1898. Bred by D. Fisher, Perthshire, Scotland; sire, Captain of the Guard (58596); dam, Mayfly (Vol. 42 E. H. B.) Exhibitors, J. & P. Crerar, Shakespeare, Ont.
2nd, Royal Bounty=30945=; roan; calved May 25th, 1898. Bred by exhibitors; sire, Prince of Wales=27131=; dam, Centennial Isabella 44th=37118=. Exhibitors, J. & W. Russell, Richmond Hill, Ont.
3rd, Kinellar Stamp (imp.)=28867=; red; calved February 5th, 1898. Bred by A. Watson, Aberdeenshire, Scotland; sire, Emancipator (65447); dam, Golden Drop 10th. Exhibitors, Jno. Fried & Son, Roseville, Ont.

Bull, One Year Old and Under Two.

1st, First Choice=30932=; white; calved September 15th, 1898. Bred by J. & W. B. Watt, Salem, Ont.; sire, Judge=23419=; dam, Lady Aberdeen=33935=. Exhibitor, T. E. Robson, Ilderton, Ont.
2nd, Joy of Morning (imp.)=32070=; dark roan; calved December 12th, 1898. Bred by W. Duthie, Aberdeenshire, Scotland; sire, Pride of Morning (64546); dam, Jessica 2nd. Exhibitor, Hillhurst Farm, Hillhurst, Que.
3rd, Hillhurst Baronet (imp. in dam)=32068=; red; calved December 27th, 1898. Bred by Lord Baring, Hampshire, Eng.; sire, Christmas Gift (66837); dam, Rhoda M. 2nd (imp.)=31171=. Exhibitor, Hillhurst Farm, Hillhurst, Que.

Bull Calf, Under One Year.

1st, Royal Wonder=34682=; red; calved September 24th, 1899. Bred by exhibitors; sire, Royal Sailor (imp.)=18959=; dam, English Lady 11th=31062=. Exhibitors, J. & W. B. Watt, Salem, Ont.
2nd, Ribbon's Choice=34694=; red and little white; calved October 11th, 1899. Bred by exhibitor; sire, Blue Ribbon (imp.)=17095=; dam, Rose Hill=21161=. Exhibitor, T. E. Robson, Ilderton, Ont.
3rd, Royal Bob=34695=; white; calved September 14th, 1899. Bred by R. & S. Nicholson, Sylvan, Ont.; sire, Royal Standard=27653=; dam, Leonore of Sylvan 16th=30533. Exhibitor, T. E. Robson, Ilderton, Ont.
4th, James Stamford Watt=34687=; roan; calved September 26th, 1899. Bred by J. & W. B. Watt, Salem, Ont.; sire, Balmoral=29879=; dam, Salem Stamford=33939=. Exhibitors, Goodfellow Bros., Macville, Ont.
5th, Knight Errant=34309=roan; calved September 22nd, 1899. Bred by exhibitors; sire, British Knight=25206=; dam, Mary Leslie=28223=. Exhibitors, W. C. Edwards & Co., Rockland, Ont.

Bull of Any Age.

1st, First Choice=30932=. Exhibitor, T. E. Robson, Ilderton, Ont.

Cow, Four Years Old and Over.

1st, Nonpareil 52nd=24418=; red; calved October 15th, 1892. Bred by exhibitors; sire, Stanley=7949=; dam, Nonpareil 44th=12696=. Exhibitors, J. & W. Russell, Richmond Hill, Ont.
2nd, Freida=27621=; roan; calved November 14th, 1894. Bred by H. & W. Smith, Hay, Ont.; sire, Abbotsford=19446=; dam, Fragrance=22729=. Exhibitor, T. E. Robson, Ilderton, Ont.
3rd, Centennial Isabella 35th=28872=; roan; calved February, 1895. Bred by exhibitors; sire, Lord Stanley=17849=; dam, Isabella 15th=18351. Exhibitors, J. & W. Russell, Richmond Hill, Ont.

Cow, Three Years Old and Under Four.

1st, Centennial Isabella 45th=37119=red; calved January 27th, 1897. Bred by exhibitors; sire, Scarlet Velvet 21446; dam, Centennial Isabella 23rd=24409=. Exhibitors, J. & W. Russell, Richmond Hill, Ont.
2nd, Ballechin Daisy (imp.)=31173=; roan; calved March 9th, 1897. Bred by A. Robertson, Ballingling, Scotland; sire, Mutineer (69169); dam, Village Daisy. Exhibitors, J. & P. Crerar, Shakespeare, Ont.
3rd, Salem Stamford=33939=; roan; calved January 10th, 1897. Bred by J. & W. B. Watt, Salem, Ont.; sire, Lynden Chief=22608=; dam, Dairy Stamford=27766=. Exhibitors, Goodfellow Bros., Macville, Ont.

HEIFER, TWO YEARS OLD AND UNDER THREE.

1st, Centennial Isabella 47th=37121=; roan; calved January 17th, 1898. Bred by exhibitors; sire, Prince of Wales=27131=; dam, Centennial Isabella 25th=20560=. Exhibitors, J. & W. Russell, Richmond Hill, Ont.
2nd, Nonpareil 58th=37125=; roan; calved March 3rd, 1898. Bred by exhibitors; sire, Prince of Wales =27131=; dam, Nonpareil 57th=31124=. Exhibitors, J. & W. Russell, Richmond Hill, Ont.
3rd, Craibstone Baroness (imp.)=34219=; roan; calved December 19th, 1897. Bred by G. Anderson, berdeenshire, Scotland; sire, Craibstone (66885); dam, Baroness 2nd. Exhibitor, T. E. Robson, Ilderton, Ont.

HEIFER, ONE YEAR OLD AND UNDER TWO.

1st, Mildred 8th=37752=; roan; calved October 27th, 1898. Bred by exhibitors; sire, Royal Sailor (imp.) =18959=; dam, Mildred 5th=31067=. Exhibitors, J. & W. B. Watt, Salem, Ont.
2nd, Matchless 25th=37751=; red; calved October 18th, 1898. Bred by exhibitors; sire, Royal Sailor (imp.)=18959=; dam, Matchless of Elmhurst 9th=17269=. Exhibitors, J. & W. B. Watt, Salem, Ont.
3rd, Lady Sowerby=Vol. 17=; roan; calved June 29th, 1899. Bred by W. Linton, Aurora, Ont.; sire, British Lion=30941=; dam, Sowerby's Bride Elect 2nd=30174=. Exhibitor, T. E. Robson, Ilderton, Ont.
4th, Lavinia's Blossom 3rd=Vol. 17=; roan; calved August 3rd, 1899. Bred by exhibitor; sire, Blue Ribbon (imp.)=17095=; dam, Lavinia's Blossom=33405=. Exhibitor, T. E. Robson, Ilderton, Ont.
5th, Fancy Lady (imp.)=34184=; roan; calved March 6th, 1899. Bred by A. Moir, Aberdeenshire, Scotland; sire, Prince of the Vale=32084=; dam, Caroline 7th. Exhibitor, Hillhurst Farm, Hillhurst, Que.

HEIFER CALF, UNDER ONE YEAR.

1st, Golden Pansy=Vol. 17=; red; calved September 10th, 1899. Bred by exhibitors; sire, Golden Flame =27770=; dam, Pansy Ray=29822=. Exhibitors, Goodfellow Bros., Macville, Ont.
2nd, Lady Hamilton=Vol. 17=; roan; calved October 3rd, 1899. Bred by exhibitors; sire, Marquis of Zenda (imp.)=26064=; dam, Madge Hamilton=23485=. Exhibitors, W. C. Edwards & Co., Rockland, Ont.
3rd, Lady Zoe 6th=Vol. 17=; red; calved October 4th, 1899. Bred by exhibitor; sire, Blue Ribbon (imp.) =17095=; dam Lady Zoe 2nd=25980=. Exhibitor, T. E. Robson, Ilderton, Ont.
4th, Vacuna 56th=Vol. 17=; white, calved September 29th, 1899. Bred by exhibitors; sire, Royal Standard=27653=; dam, Vacuna 19th=20258=. Exhibitors, R. & S. Nicholson, Sylvan, Ont.
5th, Gem of Ballechin 2nd=Vol. 17=; red and white; calved September 3rd, 1899. Bred by exhibitors; sire, Diamond Jubilee (imp.)=28861=; dam, Gem of Balleschin (imp.)=31174=. Exhibitors, J. & P. Crerar, Shakespeare, Ont.

FEMALE OF ANY AGE.

1st, Nonpareil 52nd=24418=. Exhibitors, J. &. W. Russell, Richmond Hill, Ont.

FOUR CALVES BRED AND OWNED BY EXHIBITOR.

1st, Exhibitors, W. C. Edwards & Co., Rockland, Ont.
2nd, Exhibitors, J. & W. B. Watt, Salem, Ont.
3rd, Exhibitors, R. & S. Nicholson, Sylvan, Ont.
4th, Exhibitors, T. Douglas & Sons, Strathroy, Ont.

FOUR FEMALES, BRED AND OWNED BY EXHIBITOR.

1st, Exhibitors, J. & W. Russell, Richmond Hill, Ont.
2nd, Exhibitors, J. & W. B. Watt, Salem, Ont.

BEST THREE ANIMALS, MALE OR FEMALE, GET OF ONE BULL, OWNED BY EXHIBITOR.

1st, Exhibitors, J. & W. B. Watt, Salem, Ont.
2nd, Exhibitors, J. & W. Russell, Richmond Hill, Ont.

BULL AND FOUR FEMALES, UNDER TWO YEARS, OWNED BY EXHIBITOR.

1st, Exhibitor, T. E. Robson, Ilderton, Ont.
2nd, Exhibitors, J. & W. B. Watt, Salem, Ont.
3rd, Exhibitor, Hillhurst Farm, Hillhurst, Que.

HERD OF ONE BULL AND FOUR FEMALES, OVER ONE YEAR OLD.

1st, Exhibitors, J. & W. Russell, Richmond Hill, Ont.
2nd, Exhibitor, T. E. Robson, Ilderton, Ont.
3rd, Exhibitors, J. & W. B. Watt, Salem, Ont.

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION.

OFFICERS FOR 1901.

President, W. F. STEPHEN ..... Trout River Que.
1st Vice-President: F. W. HODSON ..... Ottawa, Ont.

Vice-Presidents:

Ontario: N. DYMENT, Clappison's Corners.
Quebec: ROBERT NESS, Howick, Que.
Manitoba: GEO. STEELE, Glenboro, Man.
Assiniboia: C. W. PETERSON, Regina, Assa.
British Columbia: A. C. WELLS, Chilliwack, B.C.
Prince Edw. Is'd: HON. T. ROGERS, Charlottetown.
Nova Scotia: FRED. BLACK, Amhert, N.S.
New Brunswick: M. H. PARLEE, Sussex, N.B.

Directors:

ONTARIO.		QUEBEC	
WM. STEWART, JR.	Menie.	JAS. BODEN	St. Anne de Bel evue.
W. W. BALLANTYNE	Stratford.	WM. WYLIE	Howick.
A. KAINS	Byror.	SENATOR OWENS	Montreal.
R. S. BROOKS	Brantford.	R. HUNTER	Maxville, Ont.
J. C. SMITH	Hintonburg.	R. R. NESS JR	Howick.
A. HUME	Menie.	NAP LACHAPELLE	St. Paul l'Hermite.
F. W. HODSON	Ottawa.	W. F. STEPHEN	Trout River.

Executive Committee (Eastern Division): R HUNTER, SENATOR OWENS, NAP LACHAPELLE.

Executive Committee (Western Division): WM. STEWART, JR., W. W. BALLANTYNE, J. C. SMITH.

Revising Committee: F. W. HODSON, SENATOR OWENS J. C. SMITH, ROBERT NESS, and H. WADE

Auditor (Ontario): C. P. COMPLIN, London.
Auditor (Quebec): SENATOR OWENS, Montreal
Eastern Secretary: J. P. L. BERUBE, Montreal.
Secretary-Treasurer: HENRY WADE, Toronto.
Delegates to Industrial Exhibition: W. W. BALLANTYNE and WM. STEWART, JR.
Delegates to Western Fair: A. KAINS and R. S. BROOKS.
Delegates to Ottawa: F. W. HODSON and JOS YOUILL.
Delegates to Sherbrooke, Que: T. D. MCCALLUM and ROBERT NESS.
Delegates to Quebec: NAP. LACHAPELLE and A. DRUMMOND.

Judges Recommended.

Toronto Industrial: G. H. MUIR, St. Laurent, Que.; A. KAINS, Byron; A. Drummond. Petite Cote, Que.; and T. D. MCCALLUM, Danville, Que.
Ottawa Central: T. D. MCCALLUM, Danville, Que., and DAN. DRUMMOND, Myrtle, Ont.
London Western: W. W. BALLANTYNE, Stratford, and WM STEWART, JR, Menie.
Quebec Exhibition: HORACE LAMARCHE, St. Esprite, Que., and JOHN MORRIN, Belle Riviere, Que.
Sherbrooke Exhibition: JAS. BODEN, St. Anne de Bellevue, Que., and A. DRUMMOND, Petite Cote, Que.
Kingston Exhibition: JOHN H. DOUGLAS, Warkworth.

Life Members.

HON. THOS. BALLANTYNE, Stratford; JOS. YUILL, Carleton Place; JAS. MCCORMACK, Rockton; JOHN MORRIN, Belle Riviere, Que.; JAS. DRUMMOND, Petite Cote, Que.; THOS. IRVING, North Germantown, Que.

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The third annual meeting of the Canadian Ayrshire Breeders' Association, convened at the Monument National, 218 St. Lawrence street, Montreal, on February 15th, 1901, at 2 p.m., President A. Kains, Bryon, in the chair.

On motion, the minutes of the last annual meeting were taken as read.

REPORT OF THE SECRETARY.

REGISTRATIONS. The principal business done by this Association is the registering of pedigrees of cattle. We have recorded 1,480 this year against 1,254 the previous year, or an increase of 224, which is satisfactory; but we should have had more considering the fact that the pedigrees of the Ross' cows have been accepted; still, we cannot complain, and everything seems to indicate that the coming year will be better than the last.

MEMBERS.—In 1898 we had 140 members in both Associations; in 1890 we had 167, while in 1900 we have 190. Only 165 are entered up in the receipts of 1900; the other 25 have been sent in since the audit. It is a very gratifying increase and means so many Herd Books sent out to enable the breeders to post themselves better in pedigrees.

HERD BOOKS.—Vol. 10 is now in the hands of the printers and the entries for this volume will close on the 1st of March next. Breeders who wish the advertisement in this volume must hurry in their pedigrees. The same plan of numbering the animals consecutively is being carried out, regardless of sex. The sex is, however, designated in the left-hand corner. It will make a fair-sized volume. It will also contain a list of the premiums awarded at the Industrial Exhibition at Toronto, and the Central Exhibition at Ottawa. We have only sold eight of the older volumes, but 133 of them have been sent out to members and others.

EXHIBITIONS.—The sum of $50 was voted to the Winter Show at Guelph to be given as prizes for the milk test. It has not as yet been paid. Ayrshire cattle were brought out at different shows, at Toronto, Ottawa, Sherbrooke, Winnipeg, Brandon, St. John, Halifax and Charlottetown, in great numbers and of superior conformation and milking qualities, and the sales have been very satisfactory.

To assist in the publication of our records the Dominion Cattle Breeders' Association have promised us a grant of $250.00, which we hope to get in the near future. I also understand that there should be a balance due us in one of the Montreal banks that failed, in the shape of a dividend.

I am very pleased to state that the Ross cow pedigrees, which affected the bull Bonnie Scotland and several hundred others, has been accepted, allowing a great number of the best animals in Quebec, New Brunswick, Nova Scotia, some in Ontario and Manitoba, to be passed, so that the future of this Association will be much brighter. They have also been accepted by the American Association.

It is pleasing to be able to state that the sales of Ayrshire cattle have greatly increased during the past year. In the last half of the nineteenth century the Ayrshire cattle trade has advanced steadily along with the butter and cheese industries; and there is nothing to prevent a continuance of this advance even in the twentieth century. I would like to see a large representation of these fine cattle at the Pan-American Exposition, to take place this coming summer. But unless we send good ones it would be better to stay at home. We have the cattle, and I have been informed that the Dominion Government will pay the transport, and no doubt the local Government will do something also.

We were victorious last time at Chicago, and should be at Buffalo also. The show of cattle takes place from Sept. 9th to 21st, just after the Toronto show. The entries to be closed on July 15th, 1901 :

	1st	2nd	3rd	4th	5th
1. Herd	$80	$40	$20 00	V. H. C.	H. C. N.
2. Bull, 3 years or over	50	25	12 50	....	....
3. Bull, 2 years and under 3	40	20	10 00	....	....
4. Bull, 1 year and under 2	30	15	7 50	....	....
5. Bull, under 1 year	20	10	5 00	....	....
6. Cow, 3 years or over	40	20	10 00	....	....
7. Heifer, 2 years and under 3	30	15	7 50	....	....
8. Heifer, 1 year and under 2	20	10	5 00	....	....
9. Heifer calf	10	5	2 50	....	....

SWEEPSTAKES.

10. Bull, any age	Medal.
11. Cow, any age	Medal.

The Province of Quebec is noted for fine herds of Ayrshires, and for the liberality of wealthy gentlemen in importing the very best that can be procured from Scotland, thus enabling people of more moderate means buying bulls and thus improving their herds also. This answers for Ontario as well; the breeders there also purchase young stock from the Quebec herds, so the improvement grows apace.

The amalgamation of the Association has proved a great success. Holding the annual meeting both in Montreal and Toronto gives an opportunity for the breeders of each Province to meet together, compare notes, see one another's herds, have a little social intercourse, and in many ways help one another.

FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 31ST, 1900.

1900. *Receipts.*		
Jan.		
To balance from 1899		$151 69
Herd Books sold		8 00
165 membership fees		330 00
Registration fees, 1480 pedigrees, 562 transfers		1,445 55
		$1,935 24

1900. *Expenditure.*		
Dec.		
Printing and stationery		$ 45 50
Herd Book, bal. of cost		200 00
Premium to Winter Show		25 00
Tags		71 12
Committee expenses	$ 307 00	
Commissions	574 20	
		881 20
Postage		63 89
Auditor		10 00
Telegrams and sundries		51 60
Montreal agency	$107 45	
Expenses	23 25	
Postage	11 94	
		142 64
Balance on hand		443 29
		$1,935 24

1900. *Assets.*	
Dec. 31.	
Balance, cash on hand	$443 29
508 Vols. Dom. Herd Book, $1.00	508 00
156 Vols. Canadian Herd Book, $1.00	156 00
239 Vols. No. 9, $2.00	478 00
	$1,585 29

Liabilities.	
Balance Assets	$1,585 29
	$1,585 29

I hereby certify that I have examined the books and accounts of the Canadian Ayrshire Breeders' Association, and that the above statement is correct and in accordance therewith.

(Sgd) CHAS. F. COMPLIN,
Auditor.

Toronto, Ont., January 19th, 1901.

Moved by WILLIAM STEWART, jr., seconded by A. DRUMMOND, "That the Secretary-Treasurer's report be adopted." Carried

PRESIDENT'S ADDRESS.

By A. Kains, Byron, Ont.

It affords me much pleasure to meet you again at this our annual meeting, and to congratulate you upon the harmony and prosperity of our Association, due to the united efforts of its members and our worthy Secretary. As your President I may not have anything new to present to you, but can safely congratulate you on the present condition of the Ayrshire cattle trade. The demand for good Ayrshires this past year has been very satisfactory. Like everything else, the superior article always finds a ready sale at profitable prices, which is a proof that we, the Ayrshire breeders in this the beginning of the Twentieth Century must endeavor to raise our standard higher. We must not be content on arriving at one point of excellence, but strive for one still higher, which time, and the advancing condition of everything surrounding us clearly demonstrates that the Ayrshire breeders must not lag in the race for superiority. I repeat, we must continue to improve and be on the look-out for anything that will advance our interests.

I am also pleased to notice the marked improvement in the herds of Ayrshire cattle in the Dominion. In reviewing the different herds at the various large shows during the past season, there was one feature that forcibly presented itself to me, and that was, the marked improvement in the teats of the Ayrshires cows shown. I was very glad to see this. No breeder can dictate to the public what they should buy. It is the duty of the breeder to produce what the public want, and, consequently the small teats must be relegated to the things of the past.

In the past year the members of this Association have become members of the Catttle Breeders' Associations with a hope that better work would be done in the future. Of this, I think we will have no doubt, as, " in unity there is strength."

There is another matter I wish to speak of, that is, the annual Provincial auction sales of pure bred live stock. The first of these will be held in the City of Guelph, on Wednesday, February 27th, followed by one in Ottawa, Wednesday, the 6th of March. Each will be conducted under control of committees appointed by the Dominion Cattle, Sheep and Swine Breeders' Associations. I have no doubt these sales will be a grand thing for the Ayrshire breeders, more especially for the smaller breeders scattered all over the Province, and I think the thanks of this Association are due Mr. F. W. Hodson, Dominion Live Stock Commissioner, for his untiring efforts on behalf of these sales.

Hon William Owens congratulated the President upon the able address he presented, and he was pleased to know some definite steps were being taken whereby the interests of the Ayrshire breeders would be advanced. It was rather a matter of regret some definite lines of advancing the cattle industry had not been taken before. Mr. Owens referred particularly to the part in the President's address relating to annual auction sales of live stock, and was of the opinion they would greatly advance the Ayrshire interests throughout the Province, perhaps more than any other step that had been taken to promote their interests. A great many small breeders in the country found it difficult to sell their stock, owing to it not being properly advertised, and thus the larger and more wealthy breeders had the advantage ; but now that these sales are being inaugurated those entering their animals to be sold would have them advertised well at the expense of the Government. They would also bring the buyers and sellers together for, unfortunately, Mr. Owens said, those who should be buyers of pure bred stock, the farmers in general, were not ; but these sales would help them to procure animals at prices within their means and in this way circulate more freely pure-bred stock throughout the country. An impression had been created that only scrub stock were going to these sales, but that was entirely a false one, because, if anybody would read the circulars sent out they would see the promoters are allowing only good stock to be taken to these sales, and they were to be carried on on straightforward principles. Moreover, parties sending stock there had to guarantee it was pure-bred and up to the standard before it would be allowed to be put up at auction. He thought if that could be impressed thoroughly upon

the farmers, and the newspapers and stock journals would take it up and spread that impression throughout the country, it would be of great benefit in making these sales successful. Mr. Owens was very sorry to see, however, that one of the agricultural papers was writing detrimental articles about these sales, and, in his opinion it was a great pity as they would greatly help the agricultural industry in this country, and if there was one matter that required looking after more than another it was the fact that breeders had not been breeding enough to pure-bred stock ; they had not kept a pure bred bull, and some of them were not in a position to buy one at fancy prices, but these sales would allow them to purchase a pure-bred bull at a moderate figure, and in this way pure-bred stock would be disseminated, which would be of great benefit to the country at large. Mr. Owens concluded his remarks by stating that they should endeavor to boom the Ayrshire cattle to greater extent than in the past, as there was no better cattle in Canada than that breed.

Mr. F. W. Hodson, Dominion Comissioner of Live Stock, called attention to the clause in the Secretary's report regarding the grant of $250. He said the Association had been at a great deal of expense during amalgamation, and he had talked the matter over with Mr. Dryden, who consented that the Cattle Breeders' Association of the Province of Ontario should make a grant of $250 to help to pay the heavy expenses which were incurred at that time. The fact that the Provincial Winter Fair Building had cost more than they anticipated took a great deal of the funds of the Cattle Breeders' Associations, and left the treasury very short, but he assured the members they would get the grant of $250.

Another matter which Mr. Hodson referred to was that of making each member of the Ayrshire Association, resident in Ontario, a member of the Cattle Breeders' Association on payment of 50 cents per member, and later on, when there was a Cattle Breeders' Association formed in Quebec to make the members of that Province members of the Cattle Breeders' Association of Quebec on payment by the Association of the same fee as those of Ontario. His object, he said, in asking this, was to make the Cattle Breeders' Association a strong organization, so that when they wished any grants from the Government or reduction in transportation rates they would be able to get their demands. Mr. Hodson said during the past four or five years the Cattle Breeders' Association had accomplished marvellous things, having succeeded in getting the transportation rates throughout Canada reduced to one-half for pure-bred stock, and car-load lots were now allowed to go to British Columbia at one-half rates. This, he said, had added very largely to the success of the Western trade, as in the first five months of last year 178 car loads went from the Province of Ontario through to the Northwest Territories and British Columbia. He said they had gained very valuable concessions during the past year as any man coming from any part of Canada to buy a car load of stock got his railroad fare reduced to one cent a mile coming and was sent home for nothing, and his cattle would be sent at half rates.

Mr. Hodson also alluded to the annual auction sales which were about to take place, and said it was most important that the Ayrshire breeders should bring their animals out and put them up at auction and do their best to make them a success, because, when the western or eastern buyers knew they could pick up a car load of stock without travelling all over the Province it would attract numbers of them to attend, and in this way further the interests of the cattle breeding industry. He did not know how the impression got abroad that only scrub animals were to be taken to these sales, but Mr. Owens had put it about right when he stated the animals would be good and the sales were to be carried out on strictly straight forward principles.

He also referred to the Pan-American Exposition to be held in Buffalo, and said the Dominion Government would pay for the transportation of animals going to that exposition and pay for food in transit and while there, and they would also pay the railroad expenses of two men with each carload of stock. The Provinces promises, through the Minister, to send a man to select the stock, and it is only on condition that a man from the Province be allowed to select the stock that the Dominion Government offers to pay for transportation, etc. The breeders could send into the Department of Agriculture stating the number and kind of animals they wished to exhibit, and then the Minister would send out a competent man to go out and view these animals. He said that in the case of Ayr-

shire, Holsteins, Short Horns, and heavy horses, men had already been nominated by the Province of Ontario, and he hoped the Province of Quebec would do the same and would take like measures to be well represented at the Pan-American. He urged on the breeders that it was very important to make a large show in the live stock Department at the Pan-American. He stated that there would be a herd of five cows from each breed allowed to compete in the milk test which was to take place from the 1st of May to the end of October; they need not be the property of one man, but they could pick them up anywhere, and he thought the Ayrshire men should make a big effort to get a good herd together as it would be a splendid advertisement for Canada. He said with regard to the judges he had made representation to Mr. Buchanan that in case the Canadians and Americans met in competition one Canadian and one American should be appointed, that the Canadian appointed should be acceptable to both Canadians and Americans, and the American appointed should be acceptable to both Canadians and Americans in like respect.

Mr. Hodson in referring to small teats on cows, said it was a matter that should be looked into, and they should try and produce them with good-sized teats.

Quite a protracted discussion arose as to making all members of the Association members of the Cattle Breeders' Association. Mr. A. Drummond and Mr. Owens thought the members of Quebec belonging to the Ayrshire Association should be made members of the Cattle Breeders' Association as well as those residing in Ontario.

Mr. Hodson said as this was a Provincial Cattle Breeders Association it would be well to make the Ontario members, members now, and when they formed a Cattle Breeders' Association for the Province of Quebec they could then make the Quebec members, members of that Association.

The majority of members, however, were in favor of making all the members of the Association members of the Cattle Breeders' Association in order that they might benefit by the privileges which that Association gave, and if an Association was formed in Quebec they would transfer to that one.

On motion of Senator Owens, seconded by W. W. Ballantyne, it was resolved: That the Canadian Ayrshire Breeders' Association make all its members by virtue of their membership, members of the Dominion Cattle Breeders, Association on payment of a fee of 50 cents per member by the Association, and that two delegates be appointed to represent their interests on the Board of the Dominion Cattle Breeders' Association."

Moved by Jas Boden, seconded by Senator Owens, "That W. W. Ballantyne and A. Mc. D. Drummond be the representatives from this Association on the Board of the Dominion Cattle' Breeders' Association." Carried.

A letter was then read from Mr. Jas. McCormack, giving the following notice of motion, which he wished to go into effect, 1902: "That at the annual meeting in 1902 the constitution be so amended as to admit of only three directors from each Province, Ontario and Quebec, and the President be elected at the annual meeting instead of at the directors' meeting." No action was taken on this notice of motion.

Senator Owens moved, seconded by R. Hunter, "That in the opinion of this Association, the cattle breeding industry is seriously menaced by the tuberculin test, as applied to cattle purchased for importation or sold for export; that the test as now applied is misleading and of no real value. Therefore, we respectfully ask the Honourable the Minister of Agriculture for the Dominion of Canada, to discontinue the test so far as within his power." Carried.

After speaking for a short time on the unjust discrimination of freight rates, J. Lockie Wilson moved, seconded by Geo. H. Muir, "That we, the members of the Canadian Ayrshire Breeders' Association, in annual meeting assembled, express our regret that up to this date no action has been taken by the Government for the regulation of railway and ocean freight rates; that we especially urge that immediate action be taken by our representatives at Ottawa for the appointment of a permanent commission for the regulation of rates and the prevention of the great discrimination that now exists, and for the removal of the handicap now placed by the carriers on Canadian farmers' produce in granting lower rates for the much longer haul to our American competitors, who are thus placed in a better position than the farmers of Canada in the markets of the world; and that a copy of this resolution be forwarded to the Dominion Government." Carried.

On motion of ALEX HUME, seconded by WILLIAM STEWART, it was resolved:—"That we recommend that the Toronto Industrial Exhibition and other large exhibitions arrange to hold their shows one week later, commencing with 1902, as year by year they are earlier in the season so that now farmers and live stock exhibitors are scarcely through harvest before they commence; also, that exhibitors of dairy cattle, in some cases, require to allow their cows to calve before the first of August to have them in milk at time of exhibitions, which cripples exhibitors and is injurious to the exhibitions. Further that a copy of this resolution be sent to the large exhibition associations"

Moved by F. W. HODSON, seconded by T. D. MCCALLUM, "That Senator Owens and J. P. L. Berube be a committee to look into the matter of a dividend due this Association in the Bank Du Peuple and report to the Head Office." Carried.

F. W. HODSON moved, seconded by W. W. BALLANTYNE, "That this Association requests the Industrial Exhibition Association to have seats placed around the ring where the judging of live stock takes place." Carried.

PRIZE-WINNING AYRSHIRES AT THE TORONTO INDUSTRIAL, 1900.

BULL, THREE YEARS OLD AND UPWARDS.

1st. Silver Prince of St. Louis—7939—; nearly white; calved July 9th, 1895. Bred by Jno. Howden, St. Louis de Gonzague; sire, Lord Stirling—6927—; dam, St. Louis Belle—5658—. Exhibitor, W. E. H. Massey, Coleman, Ont.

2nd. Drummond—2036—; white, with red spots; calved March 4th, 1896. Bred by A. Terrill, Wooler, Ont.; sire, Norman of Robertland—1901—; dam, Maggie—1116—. Exhibitor, N. Dyment, Clappison's.

3rd. Douglasdale of Dam of Aber—12212—(3954); white, little brown on ears; calved April, 1897. Bred by R. M. Kinlay, Hillhouse, Scotland; sire, Douglas Chief of Hillhouse (3400); dam, Snowdrop of Hillhouse (5911). Exhibitor, W. Ogilvie, Lachine Rapids, Que.

4th. Uncle Sam of Trout River—2424—; white, few brown spots; calved November 10th, 1895. Bred by D. Drummond, Petite Cote, Que.; sire, Baron Renfrew (imp.) ; dam, Nellie Osborne, Exhibitor, W. Wylie, Howick, Que.

BULL, TWO YEARS OLD.

1st. Duke Clarence of Barcheskie (imp.) (4168); ; calved . Bred by ; sire, Mischiefmaker of Barcheskie (3892); dam, Judy 5th of Barcheskie (8457. Exhibitor, R. R. Ness, Howick, Que.

2nd. Glenor Sultan (imp.)—(10338); white and red; calved May 10th, 1898. Bred by Robt. Osborne, Lockerbie, Scotland; sire, The Sultan of Auchenbainzie (3971); dam, Bargennock 2nd of Wynholm (imp.)—9163—. Exhibitor, J. McCormack & Son, Rockton, Ont.

3rd. Glenora Knockdon (imp.)—10335—; white and brown spots; calved March 10th, 1898. Bred by Alex. Cross, Mayhole, Scotland; sire, The Sloth of Hillhouse (3396); dam, Kate of Knockdon (imp.)—9169—. Exhibitor, W. Ogilvie, Lachine Rapids, Que.

BULL, ONE YEAR OLD.

1st. Hover-a-Blink—9806—; white, with red markings; calved August 5th, 1898. Bred by exhibitors; sire, Dainty Lad of Elm Shade—2245—; dam, Jean Armour—2058—. Exhibitors, W. Stewart & Son, Menie, Ont.

2nd. Cock o' the North of St. Anne's—9997—; white, with small red spots; calved August 19th, 1898. Bred by R. Reford, Ste. Anne de Bellevue, Que.; sire, Napoleon of Auchenbrain (imp.)—8303—; dam, White Lady of Ste. Anne's 7630. Exhibitor, W. Wylie, Howick, Que.

3rd. Prince (imp.) 4328; dark brown and white; calved . Bred by . Exhibitor, W. Ogilvie, Lachine Rapids, Que.

4th. White Cockade—10492—; mostly white; calved February 25th, 1899. Bred by Exhibitors; sire Dainty Lad of Elm Shade—2245—; dam, Lady McNeil—1964—. Exhibitors, A. Hume & Co., Menie, Ont.

BULL CALF, UNDER ONE YEAR.

1st. Royal Salute—12061—; white and brown; calved September 29th, 1899. Bred by exhibitors; sire, Waverley—11350—; dam, Primrose 9th—3012—. Exhibitors, J. McCormack & Son, Rockton, Ont.

2nd. Dunraven of Glenora—11998—; white, red on head and neck; calved October 22nd, 1899. Bred by exhibitor; sire, Comrade of Garlaff (imp.)—9183—; dam, White Rose 2nd of Tower (imp.)—9182—. Exhibitor, W. Ogilvie, Lachine Rapids, Que.

3rd. Lord Roberts—11553—; white, with red markings; calved August 13th, 1899. Bred by exhibitors; sire, Glencairn of Burnside—8153—; dam, Jean Armour—2058—. Exhibitors, W. Stewart & Son, Menie, Ont.

4th. White Prince of Elm Shade—12097—; mostly white; calved August 5th, 1899. Bred by exhibitors; sire, Scotland's Glory—10774—; dam, Silver Princess 7113. Exhibitor, W. Wylie, Howick, Que.

Bull Calf, Calved After February 1st, 1900.

1st. Lord Minto—12016—; white, with brown spots; calved March 4th, 1900. Bred by exhibitors; sire, White Chief of Ste. Anne's—2086—; dam, White Queen—2674—. Exhibitors, A. Hume & Co., Menie, Ont.
2nd. Henry Wade—11634—, white and red; calved March 16th, 1900. Bred by exhibitors; sire, Glencairn of Burnside—8153—; dam, Scotch Lassie Jean 2nd—3421—. Exhibitors, W. Stewart & Son, Menie, Ont.
3rd. Kitchener—12215—; white, with red spots; calved April 17th, 1900. Bred by exhibitor; sire, Comrade of Garlaff 9183; dam Minnie of Lessnessock, 9176. Exhibitor, W. Ogilvie, Lachine Rapids, Que.
4th. Young Canada—11634—; white, with red markings; calved March 16th, 1900. Bred by exhibitors; sire, Glencairn of Burnside—8153—; dam, Primrose (imp)—1205—. Exhibitors, W. Stewart & Son, Menie, Ont.

Bull, of Any Age.

1st. Duke Clarence of Barcheskie (imp.) (4168). Exhibitors, R. R. Ness, Howick, Que.

Cow, Four Years Old and Upwards.

1st. Lady Stirling 3rd—6230—; mostly white; calved September 19th, 1892. Bred by D. McLachlan, Petite Cote, Que.; sire, Silver King 5809—; dam, Lady Stirling—5683—. Exhibitor, W. E. H. Massey, Coleman, Ont.
2nd. Edith of Lessnessock (imp.)—9166—; white; calved March, 1895. Bred by R. Montgomerie, Ochiltree, Scotland; sire, Royal Macgregor of Lessnessock (3101); dam, Stately 7th of Lessnessock (8438). Exhibitor, W. Ogilvie, Lachine Rapids, Que.
3rd. Lady Ottawa - 3001—; white, and red markings; calved September 22nd, 1895. Bred by exhibitors sire, Dundonald—1718—; dam, Jean Armour—2058—. Exhibitors, W. Stewart & Son, Menie, Ont.;
4th. Mayflower 2nd of Drumsine (imp.) 9175; white and brown; calved March, 1893. Bred by W. Winter, Coulton, Scotland; sire, Earl of Glencairn of Drumsine (2622); dam, Mayflower of Drumsine. Exhibitor, W. Ogilvie, Lachine Rapids, Que.

Cow, Three Years Old.

1st. Dandy Lass of Nethercraig (imp.) (13302); ; . Exhibitor, W. Ggilvie, Lachine Rapids, Que.
2nd. Gertie of Maple Cliff—8750—; white and brown; calved January 2nd, 1897. Bred by R. Robertson, Nappan, N.S.; sire, Matchless—7560—, dam, Jessie Brown—8747—. Exhibitor, R. R. Ness, Howick, Que.
3rd. Snowflake—3233; nearly white; calved August, 1896. Bred by exhibitors; sire, Prince of Barcheskie (imp.)—1656—; dam, Annie Lyle—2388—. Exhibitors, A. Hume & Co., Menie, Ont.
4th. Sylvia of Elmshade—9389—; spotted red and white; calved November 7th, 1896. Bred by exhibitor; sire, Lord Stirling—6927—; dam, Sylvia—5076—. Exhibitor, W. Wylie, Howick, Que.

Heifer, Two Years Old.

1st. Eva's White Pearl—9263—; white and brown; calved November 21st, 1897. Bred by exhibitors; sire, White Chief of Ste. Anne's—2086; dam, Eva of Barcheskie (imp.)—2505—. Exhibitors, A. Hume & Co., Menie, Ont.
2nd. Mary Mitchell— ; ; . Bred by . Exhibitors, W. Stewart & Son, Menie, Ont.
3rd. Nora of Elmshade—10546—; red and white; calved August 3rd, 1897. Bred by exhibitor; sire, Lord Stirling—6927—; dam, Bell 2nd of Park Hill—5569—. Exhibitor, W. Wylie, Howick, Que.
4th. Lady Spottie of Burnside—9071; white, brown spots; calved September 10th, 1897. Bred by exhibitor; sire, Harcourt of B—7890—; dam, Spottie of Burnside—8478—. Exhibitor, R. R. Ness, Howick, Que.

Heifer, One Year Old.

1st. Little Love—10488—; white, with brown spots; calved March 15th, 1899. Bred by exhibitor; sire, White Chief of Ste. Anne's—2086—; dam, White Queen—2674—. Exhibitors, A. Hume & Co., Menie, Ont.
2nd. Glenora Dairy Queen—11422—; white and red; calved April 21st, 1899. Bred by exhibitor; sire, Comrade of Garlaff (imp.)—9183—; dam, Bargennock 2nd of Wynholm (imp.)—9163—. Exhibitor, W. Ogilvie, Lachine Rapids, Que.
3rd. Lady Earle of B—12088—; white and red; calved December 2nd, 1898. Bred by exhibitor; sire, Harcourt of B—7890—; dam, Minnie of B 6282. Exhibitor, R. R. Ness, Howick, Que.
4th. Glenora Sally—11424—; white and red; calved April 15th, 1899. Bred by exhibitor; sire, Comrade of Garlaff (imp.)—9183—; dam, Tempest of Knockdon (imp.)—9180—. Exhibitor, W. Ogilvie, Lachine Rapids, Que.

Heifer Calf, Under One Year Old.

1st. Lady Bruce—12087—; white, little brown; calved September 22nd, 1899. Bred by exhibitor; sire, Goldfinder—10745—; dam, Minnie of B. 6281. Exhibitor, R. R. Ness, Howick, Que.

2nd. Irene of Menie—12014—; white, with brown spots; calved August 1st, 1899. Bred by exhibitors; sire, Dainty Lad of Elm Shade—2245—; dam, Buttercup—3350—. Exhibitors, A. Hume & Co., Menie, Ont.
3rd. Glenora Ayrshire Lassie—11419—; white and red; calved October 15th, 1899. Bred by exhibitor; sire, Comrade of Garlaff (imp.)—9183—; dam, Miss Ida of Garlaff (imp.)—9184—. Exhibitor, W. Ogilvie, Lachine Rapids, Que.
4th. Glenora Stately—11425—; white and red; calved September 15th, 1899. Bred by exhibitor; sire, Comrade of Garlaff (imp.)—9183—; dam, Edith of Lessnessock (imp.)—9166—. Exhibitor, W. Ogilvie, Lachine Rapids, Que.

HEIFER CALF, CALVED AFTER FEBRUARY 1ST, 1900.

1st. Lady Rose of B—12090—; white, and a little red; calved March 30th, 1900. Bred by exhibitor; sire, Goldfinder—10745—; dam, Effie of B. 9072. Exhibitor, R. R. Ness, Howick, Que.
2nd. Brownie of Rockton—12063—; brown, with white spots; calved April 7th, 1900. Bred by exhibitors; sire, Sir Thomas—9247—; dam, Bonnie Jean—1766—. Exhibitors, J. McCormack & Son, Rockton, Ont.
3rd. Lady Belle—12015—; white, with brown spots; calved March 4th, 1900. Bred by exhibitors; sire, White Chief of Ste. Anne's—2086—; dam, May—11196—. Exhibitors, A. Hume & Co., Menie, Ont.
4th. Miss Pringle 1st of Bankhead (imp.)—12217—(13333); white and brown; calved March, 1900. Bred by R. & W. Wilson, Stewarton, Scotland; sire, Traveller Again of Bankend (4412); dam, Miss Pringle of Bankend. Exhibitor, R. Hunter, jr., Maxville, Ont.

FOUR ANIMALS, THE PROGENY OF ONE BULL, ALL BRED AND OWNED BY EXHIBITOR.

1st. Exhibitors, A. Hume & Co., Menie, Ont.
2nd. Exhibitors, W. Ogilvie, Lachine Rapids, Que.
3rd. Exhibitor, R. R. Ness, Howick, Que.
4th. Exhibitor, J. McCormack & Son, Rockton, Ont.

HERD OF ONE BULL AND THREE HEIFERS, UNDER 2 YEARS OLD. HEIFERS TO HAVE BEEN BRED AND ALL OWNED BY EXHIBITOR.

1st. Exhibitor, W. Ogilvie, Lachine Rapids, Que.
2nd. Exhibitor, R. R. Ness, Howick, Que.
3rd. Exhibitors, A. Hume & Co., Menie, Ont.
4th. Exhibitor, W. Wylie, Howick, Que.

HERD OF ONE BULL, ANY AGE, TWO FEMALES OVER 3 YEARS OLD, ONE FEMALE OVER 2 AND UNDER 3, ONE FEMALE OVER 1 AND UNDER 2, AND ONE FEMALE UNDER 1 YEAR, ALL OWNED BY EXHIBITOR.

1st. Exhibitor, W. Ogilvie. Lachine Rapids, Que.
2nd. Exhibitors, A. Hume & Co., Menie, Ont.
3rd. Exhibitor, R. R. Ness, Howick, Que.
4th. Exhibitor. W. Wylie, Howick, Que.

FEMALE, OF ANY AGE.

1st. Lady Stirling 3rd—6230—. Exhibitor, W. E. H. Massey, Coleman, Ont.

CANADIAN HEREFORD BREEDERS' ASSOCIATION.

ANNUAL MEETING.

Following are the minutes of the Tenth Annual Meeting of the Hereford Breeders Association, held in the City of Guelph, on December, 1900.

Mr. W. H. Hunter was voted to the chair. The minutes of the last meeting were read and confirmed.

SECRETARY'S REPORT.

The Hereford breeders have had another good year; sales have again been numerous and satisfactory. In the United States sales and shows have been numerous, and large figures have been realized. The demands for bulls in Canada has been brisk, and many more could have been sold had they been in the country.

We have had the misfortune to lose our President, Mr. Walter McDonald, Barrister, etc. of Toronto, who of late years, as one of the Executors of the F. W. Stone Estate, has dealt largely in Hereford cattle. He was elected President only at the last annual meeting. His loss has been severely felt by both his family and the Hereford world at large. His courteous manners and upright business capacity had endeared him to all of us.

This year has been unprecedented in the list of shows and sales of Hereford cattle in the United States. At the Chicago sale some months ago a bull calf Dale was purchased by John Hooker of New London, Ohio, for $7,050, and at the sale just concluded at Chicago last week a cow called Dolly 5th, four years of age, sold for $3,150, which is the highest price on record for a Hereford cow. She was bred by the same John Hooker that purchased Dale, sold by him for $2,100, and re-sold at this sale for the above amount, Mr. C. A. Jamieson of Peoria, Ill. bought her. On March 13th 106675, a 1899 calf, was sold for $3,500, bred by W. VanNatta & Son of Fowler, Ind., and purchased by William Moffatt, of Bowfront, Ill. There were several other cases where over $1,000 was paid for animals, and the average was, for the two days, $445.00.

HERD BOOK. We have now on hand 708 pedigrees for our second volume. If we are prosperous another year we shall have sufficient for the second volume.

REGISTRATION. We have been paid for 300 registrations and 188 transfers for the past year; would like to increase this next year.

MEMBERSHIP. Thirty members have paid for the last year; 11 less than in the year previous.

At the Toronto Industrial Exhibition this favorite class of cattle was brought out in large numbers, and in better shape than usual. Three large herds were brought out, and judged by R. J. Mackie, of Oshawa, and Caleb Rawlings, of Ravenswood.

The exhibitors were Messrs. H. D. Smith, Compton, Quebec, and W. H. Hunter, The Maples, and The Stone Stock Company, of Guelph.

FINANCIAL STATEMENT FOR YEAR ENDING 30TH NOVEMBER, 1900.

RECEIPTS.		EXPENDITURE.	
1899.		1900.	
Dec. 1st. To cash on hand	$ 70 00	By commission on 300 pedigrees and 188 transfers	$ 123 80
1900		postage and telegrams	7 21
Nov. 30th. Reg. fees to date	284 50	printing and stationery	15 75
Nov. 30th. 30 members paid	60 00	share of typewriter	25 00
	$414 50	Auditor and copyright	3 70
		Clerk at Annual Meeting	5 00
		Balance Cash on Hand	234 04
			$ 414 05

RESOLUTIONS.

Moved by W. Reid, seconded by W. H. Hammell, "That this Association is of the opinion that the existing regulations as to ranging of cattle in the Northwest Territories should be amended, and that the amended regulations should make it obligatory for all parties running cattle on the ranches to lease a range of twenty acres per head of every animal run; that the annual rental of two cents per acre be materially reduced; that all animals run on ranges should be subject to an annual tax of 50 cents per head where the owner of the brand is not a leaseholder; that homesteads be not granted in ranging districts; that any American cattle fit for shipment found on Canadian ranges be shipped to Canadian markets, and that the duty and annual tax be held and deducted from the price obtained; that leaseholders be given liberal privileges of purchasing blocks of land within their leaseholds; that the breeders of cattle on the ranges should be encouraged by granting liberal wolf bounties; that a sufficient part of the revenue derived from the ranching industry be applied to establishing effective fire guards; that the running of scrub bulls be limited." Carried.

Moved by W. H. Hammell, seconded by Alfred Stone, "That, in the opinion of this Association, the cattle breeding industry is seriously menaced by the tuberculin test, as applied to cattle purchased for importation or sold for export; that the test is misleading and of no real value in detecting the disease. Therefore, we respectfully ask the Honorable the Minister of Agriculture for the Dominion of Canada, to discontinue the use of the test in such cases, so far as within his power." Carried.

OFFICERS FOR 1901.

President: W. H. Hunter, The Maples, Ont.

Vice-Presidents:

Ontario: Alfred Stone, Guelph.
Quebec: H. D. Smith, Compton.
Manitoba: A. E. Philp, Brandon.
Maritime Provinces: W. W. Black, Amherst.
Directors: R. Rawlings, Forest; A. S. Hunter, Durham; A. H. O'Neil, Southgate; Mossom Boyd, Bobcaygeon; J. A. McDearmid, Stayner; W. H. Hammel, Beeton; H. Reid, Mimosa; Asa Warnick, Painswick.
Secretary-Treasurer: Henry Wade, Toronto.

HEREFORD PRIZE WINNERS AT TORONTO EXPOSITION.

Bull Three Years Old and Upwards.

1st and Championship, H. D. Smith, Compton, Que, Mark Hanna 74230.

Bull Two Years Old.

1st, H. D. Smith, Compton, Que., Amos 5th of Ingleside 83594.
2nd, H. D. Smith, Compton, Que., Sylvan 5th of Ingleside 63624.
3rd, Stone Stock Company, Guelph. Baronet (imp) 1292.

Bull One Year Old.

1st, H. D. Smith, Compton. Que., Prince Ingleside 83602.
2nd, W. H. Hunter, The Maples, Young Actor 1250.

Bull Calf Under One Year.

1st, Stone Stock Company, Guelph, Stone's Clarence, not recorded.
2nd, Stone Stock Company, Guelph. Stone's Clarence 2nd, not recorded.
3rd, W. H. Hunter, The Maples.

Cow Four Years Old and Upwards.

1st, H. D. Smith, Compton, Que., Chatterbox 78777.
2nd, H. D. Smith, Compton, Que., Lady Rupert 78781.
3rd, H. D. Smith, Compton, Que., Dukmoor Brenda 78778.

COW THREE YEARS OLD.

1st. H. D. Smith, Compton Que., Sylvan 7th of Ingleside 73756.
2nd, Stone Stock Company, Guelph, Ionie 951.
3rd, H. D. Smith, Compton, Que., Lady Bountiful 78780.

HEIFER TWO YEARS OLD.

1st, Stone Stock Company, Guelph, Duchess of Moreton 22nd 85949.
2nd, H. D. Smith, Compton, Que , Laura of Ingleside 53997.
3rd, W. H. Hunter, The Maples, Brenda 4th 1668.

HEIFER ONE YEAR OLD.

1st, Stone Stock Company, Guelph, Graceful 96th, not recorded.
2nd, H. D. Smith, Compton, Que.
3rd, H. D. Smith, Compton, Que.

HEIFER CALF.

1st, Stone Stock Company, Guelph, Peach 101444.
2nd, W. H. Hunter, The Maples.
3rd, W. H. Hunter, The Maples.

HERDS.

1st, H. D. Smith, Compton, Que.
2nd, Stone Stock Company, Guelph, Ont.
3rd, H. D. Smith, Compton, Que.

HACKNEY HORSE SOCIETY.

ANNUAL MEETING.

The following are the minutes of the ninth annual meeting of the Hackney Horse Society, held at the Albion Hotel, Toronto, February 6th, 1901, 8 p.m.

PRESIDENT'S ADDRESS.

By Robert Miller, Stouffville.

I am very pleased indeed to welcome so many members of the Hackney Society to this our ninth annual meeting. It pleases me, as it will certainly please every gentleman interested in this breed of horses, to know that this Association is continually growing. We have more members this year than in any previous year. We had more members last year than in the preceding year. There is no question in the minds of any man who knows Hackney horses, about their being the best breed of light horses in this, or perhaps in any other country. The Hackney horse is not only a good horse as a roadster but also in crosses, as you most always find a large percentage of crosses when any gentleman is breeding light horses; he is a most useful horse for that purpose if he is of high standard. He is needed in these days of progress for the light harness horse.

We have had during the last year about the usual number of registrations. We had, I believe, on the 1st of January, 1900, $176.86 in the treasury, and at the beginning of this year $208 84 in the treasury. That is, an increase of something like $24.25; not a very large amount, but it is growing and increasing the amount of money in our treasury. The income during the past year has been $164 50, and we expended $132.50, and had thirty-two registrations during the year

There will be a question brought before you to-night in connection with joining our friends across the line. This is an important matter, and when the question is brought up no doubt you will discuss it thoroughly, and I think you will agree with me that it will be to our advantage to join the American Association in connection with the registration of Hackney horses. They desire us to join them, and when there is a desire so plainly shown on their part, with promises of good treatment from them, I think perhaps we can join them, and with greater advantage to ourselves at this particular time, than if we were seeking admission into their Association. It must be plain to each and every one of us that we are not getting a sufficient number of registrations to justify us in publishing a book. We could not publish a book every year; we could not publish a book every five years; a book that could not be published every year would not be of very much importance or of very much benefit to the breed. This is my opinion, and I do not expect to give you that opinion any more when this question is brought up.

On motion of Mr. Crossley, seconded by Mr. Beith, the minutes of the last meeting were taken as read.

SECRETARY-TREASURER'S REPORT.

Registrations. We have recorded thirty-two pedigrees during the year, nine more than last year, and have now 290 on hand, enough to print a first small volume. Have plenty of funds on hand. I should like to have authority given me to start printing, and I have some tenders for the printing which I now submit to the meeting.

Members. Our membership roll has been increased from 13 to 19 this year, which is satisfactory. Mr. Crossley mentioned in his address of last year that it would be advisable to discuss as to whether the annual fee be reduced to $2.00 per annum; this will be for you to consider. You would not be able to pay out so much in prize money should you do this.

PRIZES We have paid out during this season one hundred dollars—fifty to the Spring Horse Show and fifty to the Industrial Exhibtion, which is money spent in the right direction.

There is no doubt in my mind that the Hackney horse is one of the most useful horses for this country. Note the inprovement in carriage horses in Canada since he has appeared ; we see the result year by year at our own Canadian Horse Show. You have only to visit the different local fairs where a Hackney has been standing in the neighborhood to see the results. I remember distinctly a few years ago visiting the Brampton Show, when prizes were given for produce of Jubilee Chief, seeing a splendid lot, the get of this noted sire, and have heard from time to time since of the prices brought by these colts when they were old enough. Again last fall I visited a show in the town of Simcoe, one of the best of our local agricultural shows, to see a lot of yearlings and foals, the get of a stallion called Sensation, owned by Mr. A. Yeager of that town. They were a good lot, and showed lots of action, and will bring long prices in the future. I also saw the get of Lord Bardolph and of Kilnwick Fireaway at shows in Halifax last year, and noticed what an improvement they had made on the ordinary stock ; and this success has been brought about by diligent practice, as the Hackneys have most persistent enemies. The best class of mares to cross with the Hackney are Thoroughbred and Standard bred mares, as it gives them such good action.

FINANCIAL STATEMENT FOR THE YEAR ENDING, DECEMBER 31ST 1900.

Receipts.		*Expenditure.*	
Dec.		By prizes	$100 00
To balance from 1899	$176 86	" stationery, postage and sundries	20 87
" 19 members @ $5.00	95 00	" commission on 32 pedigrees and 3 transfers	11 65
" Registration fees to date	69 50	Balance on hand	208 84
	$341 36		$341 36

I hereby certify that I have examined the books of the Canadian Hackney Horse Society and that the above statement is correct and in accordance therewith.

CHAS. F. COMPLIN,
Auditor.

Toronto, Jan. 19th, 1901.

HENRY WADE,
Secretary-treasurer.

Moved by H. N. CROSSLEY, seconded by Robert BOND, "That the Secretary-Treasurer's Report as read be adopted." Carried.

OFFICERS FOR 1901.

President.....ROBERT MILLER, Stouffville.
1st Vice-President.....THOS E. GRAHAM, Claremont.
2nd Vice-President.....JOHN HOLDERNESS, Toronto

Vice-Presidents for the Provinces.

Ontario.....ROBERT DAVIES.....Toronto.
Quebec.....JAS A. COCHRANE.....Hillhurst, Que.
Alberta.....A. M. RAWLINSON.....Calgary, Alta.
Manitoba.....M. McMILLAN.....Brandon, Man.
New Brunswick.....J. R. FRINK.....St. John, N.B.

Directors : H. N. Crossley, Rosseau ; Robert Beith, Bowmanville ; E. C. H. Tisdale, Beaverton ; William Graham, Claremont ; Dr. Smith, Toronto ; Robert Bond, Toronto ; Geo. Pepper, Toronto, John Macdonald, Toronto ; D. B. Simpson, Bowmanville.

Delegates to Industrial—ROBERT BEITH, Bowmanville ; GEO. PEPPER, additional.
Delegates to Western Fair, London—ADAM BECK, London ; E. C. ATTRILL, Goderich.
Delegate to Ottawa—R. BEITH, Bowmanville.

Delegate to Montreal—Jas. A. Cochrane, Hillhurst, Que.
Delegates to Woodbridge Fair—John Macdonald, Toronto; John Holderness, Toronto; Robert Bond, Toronto.
Delegates to Horse Breeders' Association—J. K. Macdonald, Toronto; Robert Beith, Bowmanville.
Auditor—C. F. Complin, London.
Secretary-Treasurer—H. Wade, Toronto.

Judges recommended for Spring Horse Show and other Exhibitions.

Alex. Mair, Indian Neck, Staten Island, N.Y.; Richard Gibson, Delaware; Hon. Henry Fairfax, Aldie, Va.; H. K. Bloodgood, New York, U.S.; Edward Walm, Chestnut Hill, Philadelphia, Pa.; Geo. Rickell, Philadelphia, Pa.

Donations to Exhibitions for Prizes.

Moved by Geo. Pepper, seconded by H. N. Crossley, "That $50 be granted to the Spring Horse Show and $50 to the Toronto Industrial Exhibition for prizes, to be allotted as the Directors see fit." Carried.

PROPOSED AMALGAMATION.

The President read two letters which he had received from the Vice-President of the American Hackney Horse Society offering an inducement to the Canadian Hackney Horse Society to amalgamate with the American.

After the reading of these letters Mr. Thos. Graham moved, seconded by Mr. Tisdale, "That this Society amalgamate with the American Society, and Messrs. Miller, Beith, and Pepper be the delegates to confer with the American Society to make the best agreement they can."

This proposition provoked considerable discussion. Mr. H. N. Crossley said he dissented from the motion, and did not believe in this Society going out of its usefulness. "I am not opposed to an amalgamation of the books," he said, "but that resolution distinctly means that there would be a complete, absolute annihilation of this Society."

Mr. Pepper explained that the American Society asked this Society to amalgamate our Herd Books, and they would assist us in every way possible to retain our Society, we only to register our horses over there. They would accept all we have on record here, and we would be enabled to get our horses across the lines duty free, and also enable us to show at the leading exhibitions, and possibly be able to get Royal Standard in, which was rejected before.

Dr. Smith: What will the cost of registration be?

Geo. Pepper: That would be arranged by the three delegates appointed.

Mr. Robert Beith: I think the cost of registration is $2 for females and $3 for males.

Mr. Pepper said he had no doubt that they would get what was reasonable in the way of registration rates, etc., if delegates from this Association approached them in the right spirit.

Mr. Robert Miller said he thought it was all foolishness and a humbug to have to register here, and then in the American Book again, in order to show an animal over in the States. If they were amalgamated there would only be one fee to pay in order to pass over the lines free of duty, and he was of the opinion that it would be doing the Hackney breed of horses good to amalgamate.

Mr. Crossley would be quite willing to amalgamate the two stud books, but could not agree with Mr. Graham's motion. He did not favor the extinction of this Association, and never did believe in it going out of existence.

Mr. Wade considered it would be a great pity from a national standpoint, as well as a business standpoint, to allow the Americans to swallow up our Association. We had spent great deal of time and labor in forming this Society and bringing the Hackney horse prominently before the public, and now when we had it well established and were entering upon a successful era, it would be a shame to allow such a useful Association to go out of existence, as this would be the inevitable result should the two Asso-

ciations be amalgamated. He did not speak for the continuance of the Society from a pecuniary standpoint, as the remuneration in the past was not equal to the labor ; but he did think it was necessary to have an Association in Canada in order to look after the Hackney interests in general. The Americans may present some very plausible reasons for amalgamating, but they were very sharp, shrewd men and would gain their own ends after all. The members would also find it difficult to revise their pedigrees and get out catalogues if the book were over in the States. He said the Shorthorn, Ayrshire, and other Associations were a great stimulus in promoting the interests of these different breeds in this country. They, at one time, were weak and had a hard time to struggle along, but now, after years of perseverance, they were of inestimable value in promoting the interests of the different breeds. Had these Associations done the same as it was now proposed to do with the Hackney, what a great detriment it would have been to the breeds concerned? The same applied to this Association, and he believed it is only matter of a few years until we are in the same proud position as the Associations mentioned.

After a little further discussion, it was moved by Thos. GRAHAM, seconded by E. C. TISDALE, "That this Association defer publishing a Stud Book, and that we appoint Robert Beith, Geo. Pepper, and Robert Miller a committee to confer with the American Hackney Association as to joining them in registering horses, said committee to report to the directors the result of conference." Carried.

Moved by ROBERT BEITH, seconded by ROBERT BOND, "That this Society memoralize the Industrial Exhibition Association to give more liberal prizes to the Hackney breed of horses." Carried.

The meeting then adjourned.

PRIZE-WINNING HACKNEYS AT THE TORONTO INDUSTRIAL EXHIBITION, 1900.

STALLION, FOUR YEARS OLD AND UPWARDS.

1st. Squire Rickell—74—266 chestnut ; foaled in 1895. Bred by Twaddell & Sharp, Devon, Pa.; sire, Cadet (imp.)—15—107 (1251); dam, Miss Rickell (imp.)—14—237 (1248). Exhibitor, R. Beith, Bowmanville, Ont.

2nd. Bell Boy—108—282 chestnut ; near hind leg white ; foaled in 1895. Bred by Dr. Seward Webb, Shelburne, Vermont ; sire, Courier (imp.)—26—3 (1751); dam, Belle Lyons (1015). Exhibitor, Dr. J. Watson, Howick, Que.

3rd. Woodland's Performer—68—chestnut, white hind fetlocks ; foaled June, 1896. Bred by Hon. M. H. Cochrane, Hillhurst, Que. ; sire, Barthorpe Performer—52—: dam, Miss Baker—16—. Exhibitor, A. Little, Georgetown, Ont.

STALLION, THREE YEARS OLD.

1st. Stampede—103—chestnut ; foaled September, 1897. Bred by sire, Wildfire—236—: dam, Lady Cremorne (4056). Exhibitors, Graham Bros., Claremont, Ont.

2nd. Rosseau Swell—71—roan ; foaled June 12th, 1897. Bred by H. N. Crossley, Rosseau, Ont.; sire, Royal Standard (imp.)—55—(3918); dam, Althorpe Countess (imp.)—20—(6357). Exhibitors, Hodgkinson & Tisdale, Beaverton, Ont.

STALLION, TWO YEARS OLD.

1st. Rosseau Royal Oak—78—black, stripe on face, four white feet ; foaled May 12th, 1892. Bred by Exhibitor ; sire, Royal Standard (imp.)—55—(3918); dam, Lady Cocking (imp.)—11—(5530). Exhibitor, H. N. Crossley, Rosseau, Ont.

STALLION ANY AGE.

1st. Squire Rickell—74—264. Exhibitor, R. Beith, Bowmanville, Ont.

FILLY, THREE YEARS OLD.

1st. Queen Dagmar—130—brown ; near hind foot white ; foaled in 1897. Bred by Hon. M. H. Cochrane, Hillhurst, Que ; sire, Barthorpe Performer—52—; dam, Princess Dagmar—10—. Exhibitor, J. S. James, St. Catharines, Ont.

2nd. Miss Roberta—78—dark bay ; foaled Apr. 25th, 1897. Bred by exhibitor ; sire, Rosseau Performer (imp.)—34—(5391); dam, Ladybird (imp.)—15—(5510). Exhibitor, H. N. Crossley, Rosseau, Ont.

3rd. Danish Lady—129—roan ; foaled in 1897. Bred by Hon. M. H. Cochrane, Hillhurst, Que.; sire, Danish Duke—53—; dam, Lady Lyme—118—. Exhibitor, Robt. Davies, Toronto.

FILLY, TWO YEARS OLD.

1st. Hermia—90—bay ; foaled in 1898. Bred by exhibitor ; sire, Royal Standard (imp.)—55—(3918); dam, Cherry Ripe—70—. Exhibitor, Robt. Beith, Bowmanville, Ont.

2nd. Sylvia—89—bay ; foaled in 1898. Bred by exhibitor ; sire, Jubilee Chief—1—; dam, Mona's Queen—4—. Exhibitor, Robt. Beith, Bowmanville, Ont.
3rd. Cressida—87—bay ; foaled May 5th, 1898. Bred by exhibitor ; sire, Ganymede 3rd—45—; dam, Lady Aberdeen—5—. Exhibitor, Robt. Beith, Bowmanville, Ont.

YEARLING FILLY.

1st. Titania—103—chestnut, 3 white feet ; foaled May 10th, 1899. Bred by exhibitor ; sire, Squire Rickell—74—264 ; dam, Mona's Queen (imp)—4—. Exhibitor, R. Beith, Bowmanville, Ont.
2nd. Countess Josephine—111—bay, hind feet white ; foaled Jan. 18th 1899. Bred by exhibitor ; sire, Fireworks—16—; dam, Countess—20—. Exhibitor, H. N. Crossley, Rosseau, Ont.
3rd. Helena—102—chestnut ; foaled May 6th, 1899. Bred by exhibitor ; sire, Squire Rickell—74—264 ; dam, Portia—41. Exhibitor, R. Beith, Bowmanville, Ont.

BROOD MARE, WITH FOAL OF THE SAME BREED BY HER SIDE.

1st. Lady Lyme—118—roan ; foaled in 1886. Bred by W. Looker, Norfolk, Eng.; sire, Great Shot—329—; dam, Lady Walpole (2979). Exhibitor R. Davies, Toronto.

FOAL OF 1900.

1st. Thorncliffe Performer—104—bay, star on forehead ; foaled June 1st, 1900. Bred by Hon. M. H. Cochrane, Hillhurst, Que., sire, Barthorpe Performer—52—; dam, Lady Lyme—118—. Exhibitor, R. Davies, Toronto.

SINGLE HORSE, MARE OR GELDING NOT OVER 15¾ HANDS.

1st. Mona's Queen (imp.)—4—chestnut ; foaled in 1889. Bred by W. Martin, Yorkshire, Eng.; sire, Lord Derwent 2nd (1034); dam, Mayflower—2—. Exhibitor, R. Beith, Bowmanville, Ont.
2nd. Danish Lady—129—. Exhibitor, R. Davies, Toronto.

BEST MARE, ANY AGE.

1st. Mona's Queen (imp.)—4—. Exhibitor, R. Beith, Bowmanville, Ont.

SPECIALS FOR HACKNEYS.

Best Mare or Filly, Registered in the English Hackney Stud Book. Given by English Hackney Horse Society.

1st. Mona's Queen (imp.)—4—. Exhibitor, R. Beith, Bowmanville, Ont.

Best Stallion, or entire Colt, Registered in the English Hackney Stud Book. Given by English Hackney Horse Society.

1st. Rosseau Performer (imp.)—34—(5391). Exhibitor, H. N. Crossley, Rosseau, Ont.

Best Hackney Stallion, Mare, or Gelding, any Age, by a Registered Hackney Stallion, and out of a Registered or Unregistered Mare, shown in Harness. Given by American Hackney Horse Society.

1st. South Africa. Exhibitors, Crow & Murray, Toronto.

Best Hackney, Stallion, Mare, or Gelding, any Age, by a Registered Hackney Stallion, and out of a Registered or Unregistered Mare, to be shown under Saddle.

1st. Jewel. Exhibitors, Crow & Murray, Toronto.

CYLDESDALE HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The fifteenth annual meeting of this Association convened at the Albion Hotel, Toronto, on February 7th at 2 p. m., 1901, President, PETER CHRISTIE, Manchester, in the chair.

On motion of Jas. HENDERSON, seconded by John DAVIDSON, "The minutes of last annual meeting were taken as read."

On motion, the Secretary-Treasurer's report, which is given below, was adopted.

REPORT OF THE SECRETARY TREASURER.

The affairs of this Association have been more satisfactory than usual; more Clydesdales have been imported from Scotland, and a great many more have changed hands than in former years.

Your committee, consisting of Mr. Peter Christie, Mr. William Hendrie, jr., and your Secretary, appointed to co-operate with Mr. F. W. Hodson, Dominion Live Stock Commissioner, were called together at the Albion Hotel in November last, and asked by Commissioner Hodson to visit Montreal with him as a delegation to wait on the railway authorities as to having horses transported under the same rules and regulations as cattle, sheep, and swine. Mr. Hendrie could not attend at this particular time, so your President attended on your behalf. Your Secretary was deputed by the Canadian Horse Breeders' Association, and did what he could to assist in this important meeting. The Hon. John Dryden was spokesman, and the result, I am authorized to say, was, that horses with duly authorized pedigrees to be used for breeding purposes are to be transported at one-half the usual rates.

REGISTRATIONS. We have recorded this year 336 animals, or 54 more than last year, or, 84 more than in 1898. A great many more of these have been sold in some part of Canada or other; very few have gone to the United States Stud Book.

The 10th Vol. has been issued and is now ready for distribution; it contains 896 pedigrees, including those that are in the Scotch Appendix. It also contains the minutes of the Annual Meetings and a list of the prizes awarded at the Canadian Horse Show and the Toronto Industrial Exhibition for the last two years, and makes a volume of 254 pages, and cost for printing the sum of $413.50.

EXHIBITIONS. Clydesdales have been well brought out at all our exhibitions this year, and in the Government Report will be pubished a list of the awards at Toronto and Ottawa. The demand for heavy horses has been good, and at the expense of the modesty of our old friend Mr. George Moore, of Waterloo, I must chronicle perhaps the greatest exceptional achievement for Draught horses of the present age. He has always been a generous exhibitor and constant prize-winner at our home shows, but he was tempted to venture outside the limits in December last, and at the International Live Stock Show, at Chicago, in the Clydesdale Draught classes, he landed all the prizes with but a single exception, when a mistake as to the conditions cost him a prize. He practically made a clean sweep. His success was so noticeable and complete that I have thought proper to quote at some length from the report which the *Breeders' Gazette* gave of his exhibit, and the results ought to be added to our Canadian Government Report. After referring to the wisdom of the American Clydesdale Association in deciding to offer $100 gold

medals for pure-bred animals exhibited, and to the fact that the class for single horses, the weight pullers included some sent over by Peter Walker and Sons of Liverpool, England, who are famed for sparing neither money nor pains in getting the best, the *Gazette* says:—

"As there was but one prize to fight for, again there was but one winner to find, and it was easily done. The exhibits were Waterloo, Berlin and Bobs, three slashing good four-year olds owned by Geo. Moore, Waterloo, Ont., which carried example of the worst shoeing ever done by anyone calling himself a smith." This defect, I might say was remedied later on, but I fear it is a common one, and that few of our heavy draught breeders give that attention to the feet and shoeing of the horses that are necessary, particularly to animals on whose ability to walk almost their entire value depends. The *Gazette* after describing the formable rivalry to which representatives from Canada were subjected, continues:

In the next class Mr. Geo. Moore, Waterloo, Ont., began the victorious career which kept his geldings at the top of their classes until the triumph culminated in victory in the six-in-hand ring on Friday forenoon. The Waterloo geldings, despite their bad sho-ing, were easy winners, their abundant size and reach, proud carriage and elastic step carrying them quickly to the top of the class. The entire exhibit made by Mr. Moore was composed of pure bred recorded Clydesdales. They are ordinarily worked on the farm, and, as Mr. Moore says, it is doubtless a treat to see them walk off with a plow all day long. They have style and symmetry to throw at the birds, then they are matched, mated and shown as they ought to be. The pair Waterloo and Berlin weighed just 1,850 pounds each, right out of the harness when shipped to the show, and Bobs, another one of the lot, weighed 1,858, these three making up the three abreast that won later on in the class for that sort of a hitch. The prize for Clydesdale fours went also to Mr. Moore, his lot being this time Maud and Bobs in the wheel, Wallace and Bruce in the lead. The four, three geldings and a mare, are so much the type of Waterloo and Berlin that little need be said of them here. They have the same beautifully proud carriage of the head and neck, the same activity and elastic step, the same excellent action and the same sound good feet and legs, together with good ends, good middles, and admirable horse sense. Four pairs weighing 3,400 pounds or under came up for examination. Mr. Moore had in this time Wallace and Bruce, two geldings of pure Clydesdale lineage, and the leaders to Waterloo and Berlin in the four. These are off the same piece as the others. Mr. Moore showed active, stylish, well-turned geldings of the right stamp. Waterloo, Berlin and Bobs won when three abreast were shown, although the opposition was strong" Mr. Moore lost in the the fours, or rather was disqualified, because his leaders exceeded the 3,400 pounds called for, and the premium went to a double span of showy Percherons. But when the heavy fours came on it was a case of Mr. Moore first and Armour & Co's Percherons nowhere. Of the six-in-hand class the *Gazette* says: "Never have four such six in-hands been exhibited in one ring, but again the Canadians were not to be denied, and they got the blue rosette, completing a victorious progress through the harness classes never before equalled by the horses of one at a first-class show. As a further proof of the excellence of these pure bred Clydesdales it may be related that Nelson Morris, packer, bought the lot at a round price of $3,000, or an average of $500 each." The *Gazette* enhanced its appreciation of Mr. Moore's great six by publishing a handsome double page photogravure of them, and a glorious picture they make. I shall be pardoned, I am sure, for paying so much attention to Mr. Moore's success, but it was so unique and complete, and worthy of emulation, that it seemed to me fitting and desirable that it should be put on record in this place.

There was a brisk demand for heavy draft geldings at the show, and other animals were disposed of at good prices. This abundantly proves that breeding the right class is remunerative, and that Canada need not fear competition with the world. As an author says, the breadth and width of the demand must not, however, be taken to indicate that anything will do provided it is big. To command a high price the draft gelding must be sound, and he must be shapely, and the better he carries himself the more money will he bring. The greatest care must be exercised in breeding mares to procure these geldings They should posses quality as well as substance, and should be served by well-shaped, good moving, good styled stallions, level in conformation, and before everything sound.

Financial Statement for 1900.

Receipts.

1900.	
To balancee from 1899	$439 04
128 members @ $2.00	256 00
Registrations tees. 336 pedigrees and 85 transfers	403 75
Clyde Books sold	10 50
	$1,109 29

Expenditures.

1900.		
By insurance on books		$11 38
Printing and stationery		64 50
Postage and telegrams		37 57
Stenographer and auditor		6 00
Prizes		100 00
Commission on 336 pedigrees @ 35c,	$117.60	
do 85 trans. @ 15c.	12.75	
		130 35
Printing Vol. 10		413 50
Binding old volumes		106 00
Balance on hand		239 99
		$1,109 29

I hereby certify that I have examined the books of the Clydesdale Horse Breeders' Association and that the foregoing statement is correct and in accordance therewith.

Chas. F. Complin,
Auditor.

Henry Wade,
Secretary-Treasurer.

Toronto, Ont., Jan. 19, 1901.

PRESIDENT'S ADDRESS.

By Peter Christie, Manchester.

I am pleased, indeed, to meet so many of you again at the annual meeting of our Clydesdale Association, showing as it does to my mind, most unmistakeably, that, at the beginning of another century the interest in Clydesdales is on the increase.

One word as to the breeding and rearing of Clydesdales. Need we fear or hesitate to push onward? I think not. It is true we have had our dark days in the business, but what line has not? Electricity has worked wonders, but after all has it much affected the use of the heavy horse? The heavy dray work of cities and towns, for many years to come, will have to be done a good deal as in the past, and the long elastic stride of the Clydesdale seem to fill the bill better than any other of the heavy breeds. Our efforts should not be spasmodic. The demand will, I think, be steady for many years for the right kind—quality and weight always being well paid for. The British market will require a goodly number each year of the right kind; and perhaps above all the requirements of the home market should be considered.

OFFICERS FOR 1901.

President: Peter Christie, Manchester.
1st Vice-President: John Davidson, Ashburn.
Vice President for Ontario: Douglas Sorby, Guelph.
Vice-President for Quebec: Robert Ness, Howick, Que.
Vice-President for Manitoba: J. E. Smith, Brandon, Man.
Vice-President for North West Territories: John A. Turner, Millarville, Alta., and J. A. McFarlane, Saskatchewan.
Directors: Thos. Graham, Claremont; William Hendrie Jr. Hamilton; John Vipond, Brooklin; Jas. Henderson, Belton; O. Sorby, Guelph; D. McCrae, Guelph, and Geo. Moore, Waterloo.
Delegates to the Industrial Exhibition: John Davidson, Ashburn, Henry Wade, Toronto.
Delegates to Western Fair: A. Innes, Clinton, and J. Henderson, Belton.
Delegates to Ottawa Exhibition: Peter Christie, Manchester; D McCrae Guelph.
Delegates to Quebec and Sherbrooke; R. Ness, Howick, Que., Geo. Stewart, Howick, Que.

Delegates to the Horse Breeders' Association: WILLIAM HENDRIE, jr., Hamilton ; D. B. SIMPSON, Bowmanville.

Judges suggested to select from: Alex. Galbraith, Janesville, Wis.; John Davidson, Ashburn ; Robert Miller, Brougham ; A. B. McLaren, Aurora, Ill.; John Henderson, Belton ; Geo. Moore, Waterloo ; Patrick Farrell, Woodstock.

Secretary-Treasurer: Henry Wade, Toronto.

THE BRANDON FAIR.

A letter was read from the manager of "Western Manitoba's Big Fair", Brandon Man., asking that this Association give a grant in the way of prize money at their exhibition Also stating they would be pleased to have a delegate from the Clydesdale Association attend their Fair.

STALLION FEES AND LOCAL ASSOCIATIONS.

Mr. DAVID MCCRAE: The matter of amalgamation which was discussed last year is still hanging. I expected that a meeting would be called ; but the President did not see fit to call a meeting. I think it is high time something was done, and it was understood at the last annual meeting that the committee appointed to confer with the American representatives were to report to a special meeting of this Association. I am still as strongly in favor of it as I was before, if it can be carried out on lines suitable for Canada and Canadian breeders.

There are other matters which I would like to see taken up this year, and one of these is the matter of stallion fees. I think that some arrangement should be made not to put the fees up to an undue point. But to get a fair paying amount for the service of a first-class Clyde horse. It is generally known that we do not get large enough fees at present for the service of our stallions, and I think it is a very important matter to look into. We should try and have an agreement made with different stallion owners to try and raise the fee to a fair paying figure for the men who are handling the horses. I can see no reason why we should be kept down to hard-pan rates now for the service of a stallion.

Another matter: It became customary in this country at one time to get a certain service fee, and sometimes a groom's fee, but all that has been dropped now in insuring for a foal. It is not always the stallion's fault there is no foal ; more frequently it is the mare's, and for this reason I think there ought to be a service fee whether there is a foal or no foal, and then an additional amount could be arranged for for the foal. I say that this is a matter that the directors should fairly consider and look into. Now, I know that in the old country some stallions stand at a fee, foal or no foal ; so I think the time has come when some concentrated action should be made by the horse breeders to collect a certain amount for service at the time she is first served, and when a foal is insured collect the balance. And there should also be an understanding among the horse breeders as to what is a fair amount as service for a stallion. I only throw out the claim for the directors to consider, and I trust they will do something along that line in the way of taking action in the matter.

Mr. ROBERT MILLER thought this was a matter the directors should take up, and said: "I do not think we shall ever make the progress in horse breeding we should make until we adopt something like the system they have adopted in Scotland. In Scotland they have farmers' clubs, and these clubs select the sort of horse they want for service in their neighborhood. They then assure that horse a certain number of mares, at a fixed price, and give a lump sum in premium as well. I believe that system has done more to bring the Clyde to the front in Scotland than anything else."

Mr. WILLIAM SMITH: It is true that I think our field might well be enlarged, and that our Association might be extended in different ways than simply a business meeting here for the purpose of electing officers. The first point raised by COL. MCCRAE, whether the fee for the use of stallions should not be increased now that an era of prosperity has

dawned upon us, is a very important one; but I think you will all rightly agree with this fact: that it is surrounded with a great many difficulties. In the first place, all stallions are not alike—are not all valuable, and my own experience in the section of country from which I come is this: no matter whether you get three or four stallion owners to agree to a particular line of action, some one or other is liable to drop away from it. I am afraid that would be the result in this case. My own opinion is, that in the matter of this fee business, liberty of action will have to continue for some time to come. I have always been an advocate of the idea that the owner of the stallion should receive some remuneration if the mare is not in foal, and I also think that the service of the horse should be limited. I do not believe in grooms' fees. I think these fees are a thing of the past, and should be. In regard to the amount the owners of stallions should collect if the mares were not in foal, I would say about one-third of the service fee. Now I do not know whether any of these suggestions could be carried out; I see a great many difficulties in the way, but, at all events, it is worth discussing at our meeting. This would be a matter anyway that would have to be taken up by different localities, as, in one community the Clydesdales would predominate, and in another community the lighter breeds, and it would be necessary to have stallions travel in the district that would be suitable for the mares in that district.

Mr. ALEX. INNES said he believed a certain fee should be paid for the service of a mare no matter whether she had a foal or not, as the owner of a horse could not afford to travel it through the country and get paid the way he had very often been paid in the past few years. He did not see any difficulty at all in the horsemen making some arrangements if they would be honest with each other. In his opinion sometimes the horse put on the road proved to be a non-breeder, and if a mare did not breed from this horse the owner of the mare in that case should not be charged a fee; but they should be very careful in selecting sure-getters with quality and conformation combined, then a moderate fee of about $10 should be charged, one half to be paid in cash and the other half if the mare proved to be in foal. In reference to the licensing of horses, he did not think that could be done. He believed if premiums were given by this Association or by the Legislature for the procuring of good horses it might lead to organization and lead to a somewhat similar way of travelling horses to that in vogue in the old country, which has done a great deal of good in bringing the Clydsdale horse to perfection in Scotland. He believed there was not the slightest doubt that a real good horse of a kind where this premium system has had its existence in Scotland is worth more in Scotland to-day than any other horse in the world. This premium system which they had there had brought this advanced price about, and he did not see why we could not get an enhanced value for our horses here if some system of the same kind was inaugurated here.

Mr. CHOATE thought there should be a kind of lien on the mare if she proved to be in foal. He was inclined to agree with Mr. Miller that a great many people put horses on the roads that did not produce colts.

Mr. GEO. MOORE, of Waterloo, was next called upon to give his opinion of the questions under discussion, but preferred to allow those who had more to do with breeding than he to discuss the matter. He thanked them for the very nice words they had spoken in regard to his winnings at Chicago Show, and assured them that anything he could do to advance the interests of the Clydesdale he would be pleased to do it, although he was not a breeder himself. He was very much pleased with the reception he received in Chicago, and the way in which the Americans treated him. Mr. MOORE said the criticism in the Secretary's report regarding the defective shoeing was quite correct, and was a thing he wished to warn the gentlemen present against when exhibiting their horses. He found when he arrived in Chicago he had to have them re-shod in order to have the fine appearance about the feet that the American horses had. This, in his opinion, was a matter which should be carefully looked after, and it would pay all exhibitors to give special attention to it.

Dr. SMITH: "Allow me to congratulate you and the Association on the excellent representation you have here this afternoon. I see gentlemen from all over this Province who are interested in the breeding of horses, and particularly the heavy horse. No doubt seven or eight years ago when electricity came into sudden operation that tended to depreciate the horse to such a very great extent. I believe there were four hundred to

five hundred thousand horses replaced by electricity on this continent." Continuing, Dr. Smith said he thought taking it all in all the heavy horse was the best horse for farmer as he could work for his food at a very early age, and that is what the farmers wanted. The breeders of this country had been at a great deal of expense and trouble importing first-class horses, and in some cases these horses have not been appreciated, and during the past few years the reward in connection with these horses was very light indeed, but he thought the outlook was better for the future. He thought the ideas suggested by Messrs. McCrae and Miller were good ones, as he knew they had been carried out with success in Scotland for a great many years. He believed it was the right thing to charge so much for service whether the mare was in foal or not, and if the owner of the mare sold the mare directly after she had been served he should be charged the full service fee. He also thought that Agricultural Societies should give premiums of $400 or $500 for good stallions in addition to the fees paid by the individuals for the service of the horse, and if that were done we would have the breeding horses of this country improved, and we could produce as good horses as are produced any place in the world, and it would take but a short time to convince the farmers that the best horses of the various types were the cheapest horses in the long run.

Mr. W. E. WELLINGTON said he thought there was a great deal could be said in regard to the points that were raised in connection with having a lien on the mare, and there might be objections. He said: "If there was such a law in force the man buying the mare would have to take care to find out if there was such a thing, and if so, to purchase it with the understanding that he would have to pay, or be liable to pay, for the service. There should be protection to the owners of stallions who put a lot of money in them and bring them to this country at great risk; and every man should be paid according to his due, but such is not the case, we all acknowledge. I believe from what I have heard to-day you are on the right lines, and all Societies that are interested in the breeding of horses should take action—perhaps come together and exchange views and unite on some plan which will be considered not only for the interests of the stallion owners but those who own the mares as well. And I think that the farmers and breeders using good stallions should give value for the services rendered."

Major MCGILLIVRAY quite agreed with the suggestions made by former speakers in connection with fees charged for service of stallions and with regard to having a lien on the mares. He did not think any of the gentlemen present could record an instance, of late years, where a great deal of money has been made with a stallion, and as horsemen they ought to have concerted action in carrying out their propositions.

Mr. WILLIAM HENDRIE thought that as so many valuable suggestions had been thrown out by the gentlemen present and there was such a representative gathering of Clydesdale men, it would be advisable for this Association to convey their views to the Government as regards to having legislation of some kind by which the stallion owners should be protected. He thought it was a great hardship after having your stallion give service for a season to eventually find the mare sold and have no possible means of recovering the amount due for the service of that mare.

Mr. MILLER: Mr. Turner informs me that there is a law of this kind in existence in the Northwest Territories, and it is working well there. I think it would be well to draft a resolution to forward to the legislature and procure legislation, such as in the Northwest.

Mr. A. W. CLEMONS informed the gentlemen present that the Dominion Minister of Agriculture had the Stallion Owners Lien Act under consideration, similar to that in force in Manitoba, and he said it was quite possible legislation would be introduced and some action taken at the present session; but it would greatly strengthen the hands of the Minister if a resolution were drawn up and forwarded him from this Association.

Mr. WILLIAM WILKIE said there were several views to be taken of this matter. He once bought a mare in May and he found she was in foal, so he wrote the party to know if she had been served and he received a reply in the affirmative, stating she had been served before he got her, and he contended had a lien been on that mare he would have been liable for the service fee, and he thought there were difficulties whichever way a person wished to look at it.

Mr. CHOATE pointed out to Mr. WILKIE that he would have the colt, and it would be no hardship if he had to pay for the service of the mare.

The following motion was then confirmed : Moved by WILLIAM HENDRIE, jr., seconded by Jas. A. TURNER, "That this meeting instruct the Board of Directors to memorialize the Provincial Government to pass such legislation as may be necessary to guarantee the owners of registered stallions payment of service fees by making the purchasers of in-foal mares liable for payment of such fees not paid by former owners.

The meeting then adjourned.

DIRECTORS' MEETING.

The President and Vice-Presidents were elected by the Directors, and their names appear in the list of officers

On motion, it was resolved : That $25 in the form of a cup, be given to each of the following places : Calgary, Winnipeg, Brandon, St. John, Halifax, and Charlottetown, as a prize from this Association for the best stallion any age ; no horse to win more than one cup given by this Association.

It was resolved : That in case two local associations were formed in Ontario, one in the East and one in the West, for the purpose of selecting a pure bred horse for travelling purposes ; if each of said associations voted $50, or more, this Association would give a grant of $50 to each one.

Messrs. McCrae and Miller were appointed a committee to draft a constitution for these local associations.

Mr. Peter Christie, John Davidson, Thos. Graham, and John Vipond were appointed a committee to look after the forming of an Association in the East, and Jas Henderson, O. Sorby, Geo. Moore, and Col. McCrae a committee for the West.

CLYDESDALE WINNERS AT THE TORONTO INDUSTRIAL EXHIBITION, 1900.

STALLION AND FOUR OF HIS PROGENY, NOT OVER TWO YEARS OLD.

1st. Macqueen (imp.) [462], bay, white hind legs ; foaled May 15th, 1885. Bred by P. Kerr, Scotland ; sire, Macgregor (1487) ; dam, Bet of Bellamack (5506). Exhibtors, Graham Bros , Claremont, Ont.
2nd. Lord Charming, [2264] bay, 3 white legs ; foaled May 29th, 1893. Bred by R. Holloway, Alexis, Ill. ; sire, Prince Charming [2263]; dam, St. Cuthbert's Lady [2303]. Exhibitors, D. & O. Sorby, Guelph, Ont.
3rd. Westfield Stamp (imp.) [1319] light bay, hind feet white ; foaled May 10th, 1890. Bred by J. Watt, Scotland ; sire, Cairnbrogie Stamp, (4274) ; dam, Luck (11146). Exhibitor, J. C. Little, Sand Hill, Ont.

STALLION, FOUR YEARS OLD AND UPWARDS.

1st. Baron Burgie (imp.) [2723], bay, white hind legs ; foaled April, 1894. Bred by J. Laing, Scotland ; sire, Darnley Again (9182) ; dam, Dall 2nd of Burgie Mains (7431). Exhibitors, Graham Bros., Claremont, Ont.
2nd. Lyon Macgregor (imp.) [2308]; brown, hind legs white ; foaled April, 1896. Bred by S. Hunter, Scotland ; sire, Macgregor (1487) ; dam, Olivette (12797). Exhibitor, R. Davis, Toronto.
3rd. Alexander's Heir (imp.) [2557]. light bay ; foaled May, 1894. Bred by R. Forsyth, Scotland ; sire, Prince Alexander, (8899) ; dam, Brampton Lass, Exhibitor, T. H. Hazzard, Millbrook, Ont.
4th. Lord Charming [2264], bay. 3 white feet ; foaled May 29th, 1893. Bred by R. Holloway, Alexis, Ill. ; sire, Prince Charming [2263] ; dam, St. Cuthbert's Lady [2303]. Exhibitors, D. & O. Sorby, Guelph, Ont.

STALLION, THREE YEARS OLD.

1st. King of the Clydes (imp.) [2569], bay, white feet ; foaled April, 1897. Bred by A. Gibson, Scotland ; sire, Ringleader (10427) ; dam, Jess of Smiddyhill (11346). Exhibitor, J. M. Gardhouse, Highfield, Ont.
2nd. Bold Knight [2437], bay three, white feet ; foaled May, 1897. Bred by S. & J. McGerrigle, Ormstown, Que. ; sire, Macinnis [536] ; dam, Hattor Fancy. [658]. Exhibitors, Graham Bros, Claremont, Ont.
3rd. Prince of Hurlford (imp.) [2396], brown, white face ; foaled April, 1897. Bred by Wm. Young, Scotland ; sire, Prince Alexander, (8899) ; dam, Mary Ann (12977). Exhibitors, Smillie Bros., Brucefield, Ont.
4th. Prince Delectable [2666], bay, hind legs white ; foaled May, 1897. Bred by exhibitors : sire, Cedric [2262] ; dam, Cherry Ripe [2305]. Exhibitors, D. & O. Sorby, Guelph, Ont.

STALLION, TWO YEARS OLD.

1st. Royal Cairnton (imp.) [2730], bay, hind feet white ; foaled June, 1898. Bred by R. Turner, Scotland sire, Royal Standard [9847] ; dam, May Montrose (13546). Exhibitors, Graham Bros, Claremont Ont.
2nd. King Lynedoch [2378], bay, hind legs white ; foaled March, 1898. Bred by exhibitor ; sire, King's Own [2172] ; dam, Rosy of Rosyth (9537). Exhibitor, R. Davies, Toronto.

3rd. Lyon Stewart [2732], bay, 4 white feet; foaled June 7th, 1898. Bred by exhibitor; sire, Lassodie Rover [2725]; dam, Hustin Lassie (imp.) [697]. Exhibitor, J. Stewart, Springbank, Ont.
4th. Copyright (imp.) [2739], brown, hind legs white; foaled May, 1898. Bred by A. Mitchell, Scotland; sire, Baron's Pride (9122); dam, Trilby (12582). Exhibitor, R. R. Ness, Howick, Que.

YEARLING COLT, ENTIRE.

1st. Charming Lad [2923], ; foaled in 1899. Bred by exhibitors; sire, Lord Charming [2264]; dam, Nemus [2069]. Exhibitors, D. & O. Sorby, Guelph, Ont.
2nd. Lord Clarence Charming [2648], dark bay, 3 white legs; foaled May, 1899. Bred by exhibitors; sire, Lord Charming [2264]; dam, Lady St. Clair [1205]. Exhibitors, D. & O. Sorby, Guelph, Ont.
3rd. Scottish Rover [2724], bay, hind fetlocks white; foaled May 8th, 1899. Bred by G. McCallum, Shakespeare, Ont.; sire, Lassodie Rover [2725]; dam, Bonnie Chess [2792]. Exhibitor, J. McCallum, Tavistock, Ont.

STALLION, ANY AGE.

1st. Baron Burgie [2723]. Exhibitors, Graham Bros., Claremont, Ont.

FILLY, THREE YEARS OLD.

1st. Royal Lad [2344], bay, white hind feet; foaled April 4th, 1897. Bred by exhibitors; sire, the Royal Standard [2220]; dam, Lady Flashwood [1915]. Exhibitors, Graham Bros., Claremont, Ont.

FILLY, TWO YEARS OLD.

1st. Cherry Startle [2788], brown, pasterns white; foaled April 16th, 1898. Bred by R. Holloway, Alexis, Ill.; sire, Startle [2726]; dam, Cherry Sweet [2787] Exhibitors, Graham Bros., Claremont, Ont.
2nd. Charming Lady [2790], bay, white legs; foaled April 1st, 1898. Bred by R. Holloway, Alexis, Ill.; sire, Prince Charming [2263]; dam, St. Cuthbert's Lady [2303]. Exhibitors, Graham Bros., Claremont, Ont.
3rd. Jean of Hartland [2616], bay, hind feet white; foaled June 3rd, 1898. Bred by exhibitors; sire, Roslin [2124]; dam, Jean of Greenhill [2124]. Exhibitor, S. J. Prouse, Ingersoll, Ont.

YEARLING FILLY OR GELDING.

1st. Nelly Lynedoch [2603], light bay, 3 white feet; foaled Feb. 18th, 1899. Bred by exhibitor; sire, King's Own [2172]; dam, Nelly [1323]. Exhibitor, R. Davis, Toronto.
2nd. Miss Charming [2605], bay, 3 white legs; foaled April, 1899. Bred by exhibitors; sire, Lord Charming [2264]; dam, Miss Stanley [2807]. Exhibitors, D. & O. Sorby, Guelph, Ont.

BROOD MARE WITH FOAL OF THE SAME BREED BY HER SIDE.

1st. Corinne [2226], bay, hind legs white; foaled July 8th, 1894. Bred by exhibitors; sire, Queen's Own [1708]; dam, Queen Mary [2225]. Exhibitors, Graham Bros., Claremont, Ont.
2nd. Miss Stanley [2307], bay, hind legs white; foaled April, 1890. Bred by N. P. Clarke, St. Cloud, Minn.; sire, Stanley Prince [2265]; dam, Lillie Macgregor [2306]. Exhibitors, D. & O. Sorby, Guelph, Ont.
3rd. Cherry Sweet [2787], bay hind feet white; foaled May 30th, 1888. Bred by R. Holloway, Alexis, Ill.; sire, Cedric [2262]; dam, Cherry Ripe [2305]. Exhibitors, Graham Bros., Claremont, Ont.

FOAL OF 1900.

1st. Royal Queen [2802], bay, 4 white legs; foaled May 23rd, 1900. Bred by exhibitors; sire, Macqueen [462]; dam, Royal Princess [2345]. Exhibitors, Hodgkinson & Tisdale, Beaverton, Ont
2nd. Cairnbrogie Model [2926], . Bred by exhibitors; sire, Macqueen [462]; dam, Corinne [2226]. Exhibitors, Graham Bros., Claremont, Ont.
3rd. Prince Roberts [2719], bay, 3 white legs. Bred by R. Holloway, Alexis, Ill.; sire, Macara [2727]; dam, Cherry Sweet [2787]. Exhibitors, Graham Bros., Claremont, Ont.

MARE, WITH TWO OF HER PROGENY.

1st. Cherry Sweet [2787], bay, stripe in face, hind feet white; foaled May 30th, 1888. Bred by Robert Holloway, Alexis, Ill.; sire, Cedric [2262]; dam, Cherry Ripe [2305]. Exhibitors, Graham Bros., Claremont, Ont.

SPAN OF CLYDESDALES, GELDINGS OR MARES.

1st. Princess Alexander [230] and Sousie Lass [2313]. Exhibitors, D. & O. Sorby, Guelph, Ont.
2nd. Nellie Macpherson [2797] and Topsy Macpherson [2798]. Exhibitors, J. Devitt & Son, Freeman, Ont.

MARE OF ANY AGE.

1st. Royal Lady 2344]. Exhibitors, Graham Bros., Claremont, Ont.

SHIRE HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The twelfth annual meeting of this Association convened at the Albion Hotel, Toronto, on February 7th, 1901.

PRESIDENT'S ADDRESS

By H. N. Crossley, Rosseau.

It is once more my duty to call this meeting together, and address a few remarks to you in refernce to our work during the past twelve months. You will perceive from the Secretary-Treasurer's Report that our financial condition is very satisfactory, and that we have a considerable balance in the bank. This balance has accrued to us only by careful management on the part of your Directors, and considerable self-sacrifice on behalf of them and the members of the Association during the last few years. The object, as you are aware, of retaining this money and not spending it on sweepstake and other prizes, was the very laudable one of raising funds for the issuance of a Stud Book. This object, the Directors feel, they will now be able to accomplish. Following your instructions at the last annual meeting the sub or editing committee met and revised the entries for our first volume. The report of that committee is before you for your approval.

You will notice that the other items of the Secretary-Treasurer's Report are about the same as last year's, and need no further comment.

Mr. Wade is, I believe, prepared to submit a tender for your approval for the publication of your first volume.

The improvement the year before last in the quality and quantity of Shire horses at our different Horse Shows was well sustained during the past year. As far as I can learn Shire stallions have continued to obtain their full share of the patronage of the farmers, and have succeeded in making good seasons. Many more Shire horses have been imported this year than for some time past, but the owners do not appear to have taken the trouble to record them. This is regrettable, as we need all the assistance possible from lovers of the breed of Shire horses, and it is only by combined action of all such owners that we will be able to push our favorite breed into the front rank and maintain it in this the position which nature intended that it should fill.

Speaking of horses in general, there appears to have been a generally increased demand for all classes, whether male or female, aged ones or youngsters, during the past year. This increased demand has also been attended by advanced prices, particularly for the lower grades of stock. It cannot, however, be said that as yet there is any boom in our line of business. You will have no doubt heard that ably assisted by horse friends on the Industrial Board, I was able to secure you one more representative on the Industrial Exhibition Association Board.

REPORT OF THE SECRETARY-TREASURER FOR THE YEAR 1900.

There has not been much change in the affairs of this Association for the last year; it has kept on in the easy tenor of its ways. Your Secretary was pleased to hear from the Industrial Exhibition Directors that an additional delegate was allowed from this Association.

A meeting of the committee to examine the material collected, in the way of pedigrees for the first volume of the Shire Horse Stud Book, was called on Monday the 21st of this month, but as there was not a quorum it was decided to take the manuscript to the annual meeting for inspection.

I have also procured several tenders for the printing of 200 volumes, which I also present, and urge the Directors to give me authority to go on and print the first volume, even if we have not sufficient funds to pay for it all at once, as it will no doubt increase the interest of the public in this valuable breed of horses.

A list of premiums awarded at the Spring Show and Industrial Exhibition will be prepared for the Government Report.

FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 31ST, 1900.

RECEIPTS.		EXPENDITURE.	
To balance from 1899	$83 23	By postage, stationery and sundries	$4 25
10 membership fees	20 00	By commissioner on 19 peds. and 5 transfers	7 40
Registrations fees	24 50	Balance on hand	121 08
	$132 73		$132 73

I hereby certify that I have examined the books of the Canadian Shire Horse Association, and that the above statement is correct and in accordance therewith.

TORONTO, Jan. 19th, 1901.

CHAS. F. COMPLIN, Auditor.
HENRY WADE, Secretary-Treasurer.

On motion of H. N. CROSSLEY, seconded by W. E. WELLINGTON, the foregoing report was received and adopted.

OFFICERS FOR 1901.

President: W. E. WELLINGTON, Toronto.

First Vice President: Jas. M. GARDHOUSE, Highfield.

2nd Vice-President: E. R. HOGATE, Toronto.

Directors: JOHN GARDHOUSE Highfield; H. N. CROSSLEY, Rosseau: WILLIAM HENDRIE, Jr Hamilton; WILLIAM WILKIE, Toronto; Mr. BAWDEN; Jas. DALGETY, London, THOS., SKINNER, Mitchell.

Delegates to Industrial Exhibition. H. N. CROSSLEY, and JOHN GARDHOUSE (provisional)

Delegates to Western Fair: H WADE and Jas. DALGETY.

Delegate to Central Exhibition Ottawa: H. WADE.

Delegates to Horse Breeders' Association: W. E WELLINGTON and H. N. CROSSLEY.

Judges recommended for Spring Show and other shows: WM. WILKIE, Toronto; John Davidson, Ashburn; Geo. Moore, Waterloo; Arthur Johnston, Greenwood; R. P. Sterricker, East Orange, N.Y., U.S.

Auditor: F. C. Complin, London.

Secretary-Treasurer: H. WADE, Toronto.

STUD BOOK.

The Secretary submitted tenders from three different firms, and as the one from the Salvation Army Printing House was the lowest, on motion of WILLIAM HENDRIE, Jr., seconded by H. N. CROSSLEY, it was resolved: "That this Association print a Stud Book and the contract be given to the Salvation Army, the binding to be left in the hands of the Secretary with instructions that the amount paid per copy not exceed 20cts.

It was suggested that the prize-winners at the Industrial and Spring show be added, and that members receive a copy of the book free of charge, while non members pay the sum of $2.

The meeting then adjourned.

SHIRE WINNERS AT THE TORONTO INDUSTRIAL EXHIBITION, 1900.

Stallion, Four Years Old and Upwards.

1st. Belshazzar (imp.) [296] (13855), bay ; foaled in 1891. Bred by Tomlinson, Blackburn, Lancashire, Eng.; sire, Simon (5394) ; dam, Ives (12596). Exhibitor, Bawden & McDowell, Exeter, Ont.
2nd. Pride of Hatfield (imp.) [256] bay, three white legs ; foaled in 1890. Bred by G. Smales, Gowdall, Eng.; sire, Lancashire Lad 2nd (1365) ; dam, Flower (16364). Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.
3rd. Yorkshire Lad 6th (imp.) [293] black ; foaled in 1894. Bred by F. Stones, Yorkshire, Eng.; sire, Trent Conqueror (12573) ; dam, Jet. Exhibitor, P. Herold, V. S., Tavistock, Ont.

Stallion, Three Years Old.

1st. Willcott Thumper (imp.) [294] (18452) bay, one white hind leg ; foaled in 1897. Bred by J. Green, Shrewsbury, Eng.; sire, Carbon (3523) ; dam, Darley (16493). Exhibitors, Bawden & McDowell, Exeter, Ont.
2nd. Groundslow Charming (imp.) [289] bay, three white legs ; foaled in 1897. Bred by T. Westray, Groundslow, Eng.; sire, Revival (13508) ; dam, Cannock Beatrice (11852). Exhibitors, Hogate & Co., Toronto.
3rd. Mars (275] bay, white hind legs ; foaled in 1897. Bred by W. C. Salt, Eng.; sire, Vulcan (4145) ; dam, Galata (10048). Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.

Stallion, Any Age.

1st. Belshazzar (imp.) [296] (13855). Exhibitors, Bawden & McDowell, Exeter, Ont.

Filly, 3 Years Old.

1st. Violet [126] ; bay, hind fetlocks white ; foaled in 1897. Bred by Morris, Stone & Wellington, Fonthill, Ont.; sire, Pride of Hatfield (imp.) [256] ; dam, Elsie Morin [31]. Exhibitor, Jno. Gardhouse, Highfield, Ont.
2nd. Belle 2nd [137] ; bay, three white feet ; foaled in 1897. Bred by exhibitors ; sire, Pride of Hatfield, (imp.) [256] ; dam, Belle [106]. Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.

Filly, 2 Years Old.

1st. Leila (imp.) [131] ; brown, white legs ; foaled in 1898. Bred by Jno. Lewis, Wales ; sire, Ingomar 2nd (14112) ; dam, Nadine (17081). Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.

Yearling, Filly or Gelding.

1st. Victoria [147] ; black, star, nigh fetlock white ; foaled June, 1899 Bred by J. M. Gardhouse, Highfield, Ont.; sire, Darnley (imp.) [183] (3585) ; dam, Queen of Highfield [117] Exhibitor, Jno. Gardhouse, Highfield, Ont.
2nd. Rose [145] ; bay, one white foot ; foaled in 1899. Bred by exhibitors ; sire, Pride of Hatfield (imp.) [256] ; dam, Queen [65]. Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.

Brood Mare, with Foal of the same breed by her side.

1st. Laura [112] ; bay, three white legs ; foaled May, 1896. Bred by exhibitors ; sire, Pride of Hatfield (imp.) [256] ; dam, Daisy [82]. Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.

Foal of 1900.

1st. Birdie [145] ; roan, white legs ; foaled in 1900. Bred by exhibitors ; sire, Bahaillon Vulcan [274] ; dam, Laura [112]. Exhibitors, Morris, Stone & Wellington, Fonthill, Ont.

Best Mare, Any Age.

1st. Violet [126] Exhibitor, Jno. Gardhouse, Highfield, Ont.

SADDLE AND CARRIAGE HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The first annual meeting of the Saddle and Carriage Horse Breeders' Association was held at the Albion Hotel, Toronto, at 2 p.m., February, 6th, 1900, and there was a large attendance, Mr. S. B. Fuller, the president, being in the chair.

The minutes of the organization meeting were read and confirmed.

The Secretary-Treasurer then read the first annual report, which was adopted.

SECRETARY'S FIRST ANNUAL REPORT.

GENTLEMEN :—The labour of your Secretary-Treasurer has not been arduous, as all he has done outside of the meetings has been to write to the Directors of the Industrial Exhibition asking them to accept two delegates from this Association. As yet the request has not been granted.

It will be our duty to elect two gentlemen to serve as Directors on the Canadian Horse Breeders' Association, as well as to elect officers for the coming year.

TREASURER'S REPORT.

1900 RECEIPTS.		1900 EXPENDITURES.	
17 members at $2.....	$34.00	By cash, stationery and postage.....	$12.50
		Balance on hand.....	21.50
	$34.00		$34.00

The above statement is correct.

(Signed) CHAS. F. COMPLIN,
Auditor.

(Signed) HENRY WADE,
Secretary-Treasurer.

Toronto, Jan. 21st, 1900.

GENERAL BUSINESS.

Mr. GEO. PEPPER wished to amend the constitution as he objected to it being called "The Saddle and Carriage Horse Society" and designed to have the name changed to Saddle and Carriage Horse Breeders' Society of Canada," and in order to do so he made a motion that the constitution be suspended, which was seconded by Dr. SMITH, and carried.

On motion of GEO. PEPPER, seconded by W. C. BROWN, the name of the Society was changed to "Saddle and Carriage Horse Breeders' Society of Canada." Carried.

Moved by GEO. PEPPER, seconded by T. MCCARTNEY, "That the constitution be adopted as amended." Carried.

Mr FULLER delivered a practical address, in which he pointed out the importance of breeders looking for quality, no matter what class of horses their aspirations led to.

Mr. CLEMENS stated that railways had agreed to carry pure bred horses with certificates of registration at half rates, the same as other branches of live stock.

Mr. PEPPER moved that a prize of $600 be given to the spring horse show for the championship harness horse, mare or gelding, and stated that Mr. Walter Harland Smith would give half the prize, and he would give the other half.

Mr. Geo. Pepper also moved, seconded by W. C. Brown, "That this Society should give $50 to the Toronto Industrial Exhibition show for the championship saddle horse, mare or gelding, the same to have won first prize at any recognized show." Carried.

On motion of H. N. Crossley, seconded by W. C. Brown, it was resolved, "That this meeting has heard with a great deal of satisfaction that it is the intention of the Government to introduce a bill to be known as the Stallion Lien Act.

Mr. Geo. Pepper offered a resolution in effect, "That this Society memoralize the Toronto Industrial Exhibition Association, and ask them to reconstruct their prize list in as far as it affects the saddle horse, carriage horse, and hunters, and that they increase their prizes in proportion to the amount given at other first-class exhibitions and by other associations." Seconded by T. H. McCartney and carried.

Moved by W. C. Brown, seconded by T. H. McCartney, "That the Hon. John Dryden, Minister of Agriculture for Ontario, be asked to introduce legislation at this session for the purpose of providing for the licensing and inspection of stallions." Carried.

OFFICERS FOR 1901.

President: S. B. Fuller, Woodstock (re-elected).

First Vice-President: W. Harland Smith, Toronto.

Second Vice-President: Ald. O. B. Sheppard, Toronto.

Directors: W. C. Brown, Meadowvale; T. H. McCartney, Thamesford; Dr. J. T. Gallanough, Thornhill; D. T. Lowes, Brampton; Wm. Graham, Claremont; Dr. Andrew Smith, Toronto; E. W. Cox, Toronto; Geo. Pepper, Toronto; Wm. Hendrie, Jr., Hamilton; Thos. A. Crowe, Toronto.

Representatives on the Board of the Canadian Horse Breeders' Association: W. Harland Smith, Toronto, and Geo. Pepper, Toronto.

Delegate to Toronto Industrial: W. Harland Smith, providing that Toronto allow a representative from this Society.

Secretary-Treasurer: H. Wade, Toronto.

Corresponding Secretary: H. J. P. Good, Toronto.

Mr. Grant Henderson, Special Canadian Commissioner for the Pan-American Exposition at Buffalo, addressed the meeting, urging the breeders to make exhibits at their exhibition and still maintain the record which they had for producing the very best class of horses. He stated the exhibit for horses would be held from the 7th to the 19th of October. There would be no trouble about duty in taken the horses there and returning them, as no duty would be collected, and no deposit would be required. They had not as yet got out their full premium list, but the gentlemen present would be able to see from a pamphlet which he had handed the President, and contained a synopsis, that the prizes were large. One gentleman in Winnipeg was very much interested in the Exposition, and was going to come all the way down from there to exhibit a team, and he says he can beat anything that will show at Buffalo.

The Dominion Government, so Mr. Hodson had informed him, was going to pay for the transportation of cattle and horses going there, and if they did this it will be quite a relief to those exhibiting, and owners could not afford to lose such a chance as this of advertising their horses. Just as soon as a business house stops advertising it begins to lose business, and the same rule applies to a country or an interest. You have no reason to fear the test. Mr. Moore, of Waterloo, cleaned out everything at Chicago with his Clydesdales.

President Fuller emphasized what Mr. Henderson said. Every man who has good horses, he said, should show them at Buffalo. Mr. Fuller had sold many good horses in Buffalo, and he never found better people to do business with than those of that city.

The meeting then adjourned.

CANADIAN HORSE BREEDERS' ASSOCIATION.

ANNUAL MEETING.

The seventh annual meeting of the Canadian Horse Breeders' Association was held at the Albion Hotel, Toronto, at 2 p. m., February 8th, 1901.

Moved by D. McCRAE, seconded by JOHN DAVIDSON, "That the minutes of the last meeting be taken as read." Carried.

On motion of Jas. HENDERSON, seconded by A. INNIS, the Secretary-Treasurer's report was adopted.

OFFICERS FOR 1901.

President: Dr. A. SMITH, Toronto.
First Vice President: H. N CROSSLEY, Rosseau.
Second Vice-President: ROBERT BEITH, Bowmanville.

Directors:

Hackney Horse Society: JOHN MACDONALD, Toronto, and ROBERT BEITH, Bowmanville.

Clydesdale Horse Association: WILLIAM HENDRIE, jr., Hamilton, and D. B. SIMPSON, Bowmanville.

Shire Horse Association: W. E WELLINGTON and H. N. CROSSLEY, Toronto.

Thoroughbred Association: Dr. ANDREW SMITH, Toronto, and SHELTON B. FULLER, Woodstock

Trotting and Pacing Horse Association: E. W. COX, Toronto, and J. M. GARDHOUSE, Highfield.

Draught Horse Association: ALEX. INNES, Clinton, and JAS. HENDERSON, Belton.

Saddle and Carriage Horse Society: GEO. PEPPER and WALTER HARLAND SMITH, Toronto.

Delegates to Industrial Exhibition: WILLIAM HENDRIE, Jr., and WILLIAM SMITH, Columbus.

Delegates to Western Fair: JAS. MCEWEN, BYRON and O. SORBY, Guelph.

NEW BUSINESS.

A discussion took place upon the advisability of offering premiums to different agricultural associations for the purpose of having such associations buy high-grade pure bred animals for travelling.

Mr ROBERT MILLER: I think the time to be very opportune to start an agitation through this country to form associations for the purpose of selecting pure-bred stallions to travel in different districts, such as in Scotland. I understand there are considerable funds in the treasury of this Association, and I also understand that it would not be advisable to increase that surplus very much, because there have been some complaints made from different sections of this country that the Provincial Government are giving you moneys simply to hoard up and not to be expended. Now, of course, we do not want that feeling to be created in any part of this Province; and I also believe, through conversations which I have had with some gentlemen in authority, that it would be a very nice way of spending this money. It would give each and every part of the Province a chance to have travelling in the community a first-class stallion, and a chance to get some money, by forming an association or society, this association to send out delegates to select a pure-bred stallion for the district, and they to pay a certain premium for the purchase of such stallion, and this premium to be augmented or supplemented by a grant from the Horse Breeders' Association. I would move that this Association supplement the premium paid by any society formed for the purpose of selecting a pure-bred

stallion for the purpose of travelling in their district, under certain conditions, by the addition of $100, and this amount to be given to say, ten societies, which would make the Canadian Horse Breeders' Association liable for $1,000, and I do not think you could limit yourself to any particular breed.

Dr. SMITH: How much should each society give?

Mr. MILLER: My opinion would be that the society give $100 or more. I think that would be a popular way of expending some of this money.

Mr. D. MCCRAE: I have much pleasure in seconding this motion. Something of this sort was done at the Clydesdale meeting yesterday, but not quite so generous as the amount we are asking this Association to grant. I know I have heard several horsemen make complaints that this money was largely being expended in Toronto for the benefit of Toronto horsemen. I do not share that feeling at all, although I do know it is indulged in to some extent in the country. I think it is a very good way of distributing part of the surplus of the Association to the best interests. I quite agree with Mr. Miller, that the premiums should not be confined to any one breed, but it certainly should be restricted to pure-bred animals—to such breeds as are associated with our Dominion Horse Breeders' Association. We know in some sections of the country a thoroughbred might be best, and in other sections a Clydesdale would be preferable. The society formed could give $100 or more as a premium, and in addition to that local subscription a certain amount should be paid by the members for each service fee. I would make it $15. A certain amount of this money proposed could be granted for Eastern and Western Ontario, a certain portion for Manitoba and so much for the Maritime Provinces. One advantage that would come from this system would be that we would find, as recommended by Hon. Mr. Fisher, a sort of system of breeding by sections; that is, that the people of one section would select the animal most suitable for that section, and that the great bulk of people in the neighborhood would raise animals of that class.

Mr. WADE suggested that the whole amount given be confined to Ontario, as the Government grant, which will be largely depended on to furnish the funds, comes entirely from this Province. The majority of the members concurred with the secretary in his suggestion.

Mr. GEO. PEPPER objected to the proposition of Messrs. McCrae and Miller, and said that the society had been formed in the first place with the idea of establishing a permanent building for holding horse shows and live stock shows, and this was the reason they were hoarding their surplus. He thought if the Association would go before the Government and ask for this money to grant to the different societies they would have no difficulty in getting it, and it would allow them to retain their surplus and accumulate more with a view of erecting a suitable building at a suitable date. Mr. Pepper also said there were seven or eight different classes of horses, and if three or four in each class west of Toronto would make application the funds of the Association would soon be exhausted.

Mr. MILLER said the Government would never consent to undertake the distribution of money in that way. They, as an Association, would have to relieve the Government of that responsibility and assume it themselves.

Mr. H. N. CROSSLEY: I agree with what Mr. Pepper has said. It would be rather foolish for us to launch out in that direction unless we had some justification that we could continue these grants from year to year. It is a very serious thing, and I would move a little cautiously. I suppose many of you know there may possibly be a military tournament this year in combination with the horse show. Now, you know the way in which the military men approach us. As a matter of fact we have to approach them, and we cannot get anything without their consent. We are going to incur a very considerable liability, no doubt, and we ought to be very cautious before we incur an additional one.

Mr. W. E. WELLINGTON: I think that resolution before the meeting is certainly a move in the right direction. I am not prepared to state from the little I know of the finances, and the time it has taken to accumulate the same, whether we are in a position to go on with that movement or not; but I do know, that if we wish to encourage the breeding of fine horses, and encourage in this way the importation of the very best stallions it is necessary to encourage those gentlemen importing stallions to put such an amount of money in them as will procure the very best to be had in England or Scotland. In order to procure the best in England now it is necessary to pay a good price, because in England—and I presume in Scotland—the plans are similiar to those being discussed;

that is, the stallions there are pratically rented and sure to bring a good income. I know that in Shire stallions, in the greater part of England, that wherever they are of good merit they bring all the way from two hundred pounds upwards, and in one case I know where five thousand pounds were paid by an Agricultural District for a service stallion for the season. It is simply done in this way—the Agricultural Districts rent the stallions to members at a certain sum for service, and outsiders have to pay, I think, double the amount, and the result is they get the service of the very best stallions; and that is one reason, as I have found to my cost, it is so hard to import really choice stallions from England, as the breeders in this country have not been using the best. I think this is a move in the right direction, and I think if districts could form Societies on somewhat similar lines to those in England and bonuses given by this Society, or by the District Society, or by the Government probably, there would be some inducement to bring out such sires as we want for breeding. As to our finances for building purposes. It is very desirable to have a building, and I only wish we had a proper building; but I think the trouble would be in the Local Legislature, where they would not feel disposed to make a grant towards anything of this kind. It is a narrow idea for outsiders to imagine Toronto is deriving all the benefit from this Horse Show because they forget that the Province benefits just as much as Toronto, or more so. This idea of having the grant given to some other places is one that originated with certain members outside of Toronto advocating the claims for their district, forgetting that while it had to be located some place it was not for the benefit of Toronto only but for the benefit of the whole Province, and the success of this Show is no doubt due, to a large extent, to the men of Toronto who have used their energies in bringing it to the present position, and there is no question but this is the point where these Shows should be held. I think we need a building, but I think we shall have to find some other way of getting it than from the source indicated by Mr. Pepper.

Mr. ADAM BECK, of London, in speaking in connection with the Toronto Horse Show, said that the agitation regarding part of the grant going to other shows originated from a member who represented the city he came from, and while he was Master of the London Hunt and a non-resident of Toronto, he could only assure the Association so far as they were concerned they had no jealous feeling or any wish whatever to transfer the holding of the Toronto Horse Show from Toronto to any place. Continuing, he said, "I think Toronto is the only place in Ontario where this Show can be successfully held, and so far as London Hunt is concerned we are only too pleased to do our best to help you stimulate it by giving our presence. The London Hunt could not carry the issue through at all the same as Toronto has done, and although the grant is made to the Canadian Horse Breeders' Association, and the Toronto Hunt is now deriving some benefit from it, they had to take a great responsibility in meeting any deficiency if it had not proved a success, and to them is due the credit and success to a great extent of the successful Show which we are now holding. And, of course, we all know Toronto Horse Show is to Canada what the New York Horse Show is to the United States. It has done a great deal to educate us, and to teach us what we require. It has also helped us to sell our horsee; because, if a horse wins it is a saleable horse: and it has not only been a great benefit to breeder and dealer but to the horse interests at large." Mr. Beck then expressed his approval of the motion just moved and seconded, and thought it would be the means of educating the farmers to breed to a better type of horse, rather than, if two were travelling in the same neighborhood, have their mares served by a five dollar one just because it was half the price of the other one. With reference to a building for Horse Show purposes, Mr. Beck did not favor the proposition. He said all the Horse Show Associations in the United States did not own their buildings, they were owned by private corporations, and with the limited means in the treasury it would be too large an undertaking to think of erecting a building suitable for show purposes, as this was a matter for a private concern to undertake. He also thought if this Association was not in a position to give $100 to each Association forming for the purpose of selecting a first-class stallion to travel in certain districts, they might give $50, as it was an advance in the right direction.

Mr. D. MCCRAE: I believe in the co-operation among you mare owners, and in a very few years it is astonishing the amount of good that will be done for the horse industry throughout this country.

Mr. PEPPER: It has taken us six years to collect the amount we have in the treasury, and now the proposition is to give away twice our annual income. It would cost $75,000 to erect a building and already $30,000 has been subscribed. A committee from this Association could approach the Government and get them to make a grant of a few thousand, and for the next three, four or five years we could put our surplus towards paying it off, which would be much better than granting $1,000 out of our money just now.

Mr. ALEX INNES: Did I understand that these gentlemen must go to the Old Country and pick the stallions.

Mr. D. McCRAE: No; the District Society will pick their horse from wherever they can get the best here.

Mr. WILLIAM HENDRIE, jr., of Hamilton, said he for one would not be in favor of putting the money into a building, and he thought the motion was a move in the right direction; and, as Mr. Pepper had said, we had been years in collecting this surplus, he (Mr. Hendrie) would suggest that the amount be five or six hundred, as the demands this year from the military were very heavy, and we would have to guarantee about eleven hundred dollars.

Mr. ROBERT MILLER said they had the assurance that the grant we already received would be increased if those in authority could see that we were expending our money in this way and for the benefit of the horse interests.

MR. WILLIAM SMITH of Columbus, said the only difficulty he could see in the way was, they could not keep the grant up from year to year, and he agreed with the proposition of Mr. Hendrie. It was an advance in the right direction, but he thought the amount was rather large to commence with.

After a little further discussion as to the amount granted the following resolution was adopted:

Moved by ROBERT MILLER, seconded by DAVID MCCRAE, "That this Association desiring to advance the best interests of horse breeding throughout the country, hereby authorize the directors to offer premiums to encourage the placing of the very best stallions in the district where horse breeders guarantee a sufficient sum for his services, in Ontario; the details to be determined by the directors, and the gross amount not to exceed $500".

Mr. INNES suggested that the Directors restrict the grants to Agricultural Societies, because if they did not, different Syndicates throughout the Province would be asking for the money. Mr. Henderson concurred with Mr. Innes in his remarks, as well as several other members.

On motion of WILLIAM HENDRIE, jr., seconded by ADAM BECK, it was resolved: That a committee be chosen by the directors of this Association to interview the Dominion Government with a view to procuring a grant for a Canadian Horse Show.

DIRECTORS' MEETING.

The directors appointed from among their number a president and two vice-presidents, which will be found in the list of officers.

On motion it was resolved that Mr. HENRY WADE be re appointed Secretary at the same salary.

Moved by W. E. WELLINGTON, seconded by H. N. CROSSLEY, "That Messrs. McCrae, Leith, and Hendrie compose the members of the delegation to proceed to Ottawa on the 13th of February, or as soon after as can be arranged, to interview Hon Sydney Fisher with regard to grant for Horse Show." Carried.

Mr. INNES moved, seconded by Mr. HENDERSON, "That Mr. Robert Miller and Mr. David McCrae be a committee to draft rules and regulations in connection with grants to Agricultural Districts, said rules to be submitted to a special meeting of the directors. Carried.

Moved by H. N. CROSSLEY, seconded by A. INNES, "That a grant of $50 be given by this Association to the prize list of the Toronto Industrial Exhibition Association. Carried.

On motion, the following gentlemen were appointed representatives from this Associ-

ation on the Joint Horse Show Board: Messrs. Dr. Smith, Robert Beith, Geo. Pepper, H. N. Crossley, William Hendrie, jr., W. E. Wellington, Jas. M. Gardhouse, D. B. Simpson, John Macdonald, W. Harland Smith, and the Secretary.

The following gentlemen were chosen as a Special Committee to arrange for the Horse Show in conjunction with the Military and Hunt Club: Dr. A. Smith, Geo. Pepper, H. N. Crossley, William Hendrie, jr., and W. E. Wellington.

GREAT GATHERING OF HORSE BREEDERS.

On the evening preceding the annual meeting of the Canadian Horse Breeders' Association, namely, on Feb. 7th, the annual dinner of the Association was held in the Temple Café. It was a date well chosen, as it near in the midst of the annual gatherings at Toronto of the various horse-breeding societies of the Dominion, leading as a consequence to the attendance of upwards of a hundred gentlemen, interested in the welfare and development of the horse. The after-dinner addresses, which were of an unusually practical character, were listened to with the greatest attention, showing a quickening interest in the opportunities of the horse-breeding industry, and a determination to profit by the chances offered this country in the present constantly increasing demand for sound, well-bred animals. The matter of the improvement of horses in Canada was exhaustively dealt with by several speakers, among whom was the Premier of the Province, Hon. G. W. Ross, and the Provincial Minister of Agriculture, Hon. John Dryden, the addresses of both of whom are herewith given.

ADDRESS BY HON G. W. ROSS.

This Association which I have the pleasure of meeting for the first time, is, in my opinion, a very useful body. I am glad to see my old friend Dr. Smith presiding over it, for he has done a great deal for this industry; and it is a great industry. According to the last official report there were six hundred and fifteen thousand horses in the Province of Ontario,—not all Clydesdales, not all Hackneys nor Roadsters—and notwithstanding there are no doubt many bad ones, that represents in money some thirty or forty, or even sixty million dollars that is spread all over the country. I suppose the question you are most concerned in, and the one I am most concerned in is, how to obtain the greatest value for the horses on our Canadian farms and the horses raised by Canadian stock-breeders. Now, the experience of the Ontario Legislature, and particularly of the Department of Agriculture, is that nothing pays that is of inferior quality; that the best goods pays the best. The farmer who keeps the best dairy makes the most of his cows, the cheese manufacturer who makes the best cheese makes well out of his cheese, and the men who raise the best cattle and the best sheep,—and there are good authorities on that class of stock here as well as on horses—make the most out of those commodities. That rules applies to horses—it applies to everything .The man who keeps the best farm makes the most out of it; and what we are concerned in is, can we in any way be useful in helping you to raise better horses than you do, in fitting them better for the market, or in putting them up on the market in more favorable conditions? You know the great trouble we have had in Canada for a number of years is in getting a market for our goods, and preparing our horses for the market after it is found. The fruit growers had great trouble in getting their fruit on the British market. They did not know what the British market required, or the difficulty in getting their goods there in the proper condition. They are now finding out the fruit the British market requires, and that is the great market for all kinds of surplus fruit. They are finding that they are able to send fruit to the British market and procure larger profits. It is the same, as I said before, with dairy produce and cheese; and the same holds good, I venture to say, with regard to our Canadian horses. We cannot sell our horses among ourselves; that is, we can raise more horses than we can find market for in this country. There are only two markets, one the United States and the other the British market. Now I do not know which is the more profitable market. But if you have a market, and you have the right

thing to sell, you have the two conditions of success in business, in horse-raising and everything else. You know what kind of market there is in England, and we are striving and hoping we will secure the British market.

Here is an illustration in point: We found we could produce the right kind of bacon for the British market, and in five years we increased our bacon exports from eight hundred thousand to about twelve million dollars. We just produced what John Bull wanted for his breakfast.

I had an interview with the Governor-General a few weeks ago in hopes that he would assists us in establishing a remount station for the British service, and I had the assurance that His Excellency would give all the assistance in his power. I think that is of great importance. Now if our horse breeders prepare a standard, a fixed standard as to the kind of horses that will sell as remount horses or just such kind of horses—then there would be no doubt on the part of the man who produced the horse as to the marketable quality of that horse. I am told that during the early part of the war horses were sent to South Africa at the rate of about twenty thousand per month Why did we not sell more the British service? The greater number were purchased in the United States. I am informed the Canadian horse had more endurance and was more manageable, and altogether, more serviceable than horses from any other part of the world. If we get that certificate as to the quality of these horses it is worth while looking into to see if it be so. We know our Canadian contingents sent there equalled those of the regular army, and the best in the British service. Now, having the best men, if we had the best horses it will give a higher opinion of our country. Our men compared favorably in that country; we did not sell them, we did not give them away. The other commodity we want to sell, we would not give away. Now if the Ontario Legislature will be of any use to you in bringing this matter strongly before the Imperial Government we shall be delighted to co-operate with you There is now a disposition in the Imperial Government to favor Canada in the way of trade. There is no doubt we have been paving the way by circumstances I need not mention, and it is to be hoped we will take advantage of those circumstances; and I think now is the time to get the ear of the Imperial authorities in regard to this important item. And if they appreciate and help us, we will gladly co operate with them. I propose bringing this matter before this session of the Legislative Assembly, and we shall seek the aid of the Dominion Government, and I feel certain as a result we shall have a respectful hearing from the Imperial Government, and more than a hearing, as we expect this movement will be followed up with practical results.

I believe the climate of this country is adapted to grow the best stock of all kinds, whether it be cattle, sheep or horses, the best stock for vitality, vigor and energy that can be found in any country, and I am glad that there are here to-night so many men of comprehensive views and with intelligent opinions as to how that stock can be best fitted for the home market as well as the markets of the world.

I need not keep you. The Minister of Agriculture is here, and understands this question much better than I do, as I merely very often follow where he leads. He has given a great deal of attention to every matter affecting the farming interests, over which he has presided so long. He has pressed upon us demands from the various departments of Agriculture, and none the less has he pressed upon us the importance of attending to the industry in which you are concerned; and if you only advise him wisely, and he is as insistent as he usually is in getting his own way—for in matters of agriculture he leads the House—if you advise him well, we can, between us, return the compliment and assist you somewhat in the future. I hope this Association, however, will give its attention to this matter, and as years go on we will all feel no matter what department we are engaged in, we owe it to ourselves and this grand country that no slumbering industry and no dormant source of wealth will remain uncultivated. For a long period Canadians seemed to think that we had not the force or energy or capacity to make much of ourselves or of our country, but we have risen from that slumbrous and dormant condition, and now we feel we are somebody, and Canada is a country worthy of our best energies. (Hear, hear). The mineral resources of this country will not be known for a century to come. And I believe we are only on the fringe of developing them. We have just touched upon a few great mines in Northern Ontario which are equal to those in Minnesota and Michigan; but much if our mineral wealth is lying untouched to this moment. What the future will be none can tell; but this much is

quite evident at this moment, the future economist will be compelled to say that the centre of gravity in the mineral wealth has passed to this continent. It is true the United States is to-day producing more iron and ste l than Great Britain. I believe somewhere between the United States and Canada the centre of gravity of the world's mineral wealth is to be found. We have certainly the nickel, I believe we have the iron ore and other mineral wealth as well, and we have very valuable forests.

And, as far as agriculture is concerned, we have not yet attained anything like the development we should reach. We have less than two million sheep in this Province, and we should have twenty million. There is an unlimited demand for all we supply—five fold, six fold, ten fold. We export now about sixty or seventy dollars worth per head, and yet, we do not export what we might if we applied ourselves with greater intelligence to the production of wealth. No nation can be strong unless it turns its raw material into gold. The British iron industries are the greatest in the world, and her skilled artisans have given her manufacturing prosperity. We have the raw material but have we the skilled artisans to turn these products into wealth ? And what is true of the individual is true of the nation. For centuries Great Britian has applied herself to the development of British wealth, and to-day she is the banking house of the world —the clearing-house of the world.

We are here considering the right arm. Let it be a vigorous arm, one that will be afraid of nobody and afraid of no competition, let us be ready to hold ourselves up to a high standard, and to make the nation strong and intelligent, and ready to help the good land in the hour of adversity should such overtake her and her interests. And it is the true patriotic spirit which makes men of us, and making strong men as individuals will make a strong nation of us. (Applause.)

ADDRESS BY HON. JOHN DRYDEN.

I think if I never did anything for the Horse Breeders' Association before to-day I deserve some credit for having induced my chief, the Premier of Ontario, to come to this banquet. I know you are delighted with what he has said to you. I do not think I ever had a better show of getting anything from the Legislature of Ontario, and the Legislature is about to speak for itself. That body has always been very kind to the agriculturists of this Province. You know from what the Premier said, we have a great deal to do to carry on educational work along the lines of agriculture in this Province. But I am bound to say—and I speak honestly when I say it—that for the good of the agriculturist and the people in general we have secured what is needed to promote the various interests which we have had in hand. My policy, and the policy of the Legislature for years, has been organization in the various branches of agriculture. We have the Horse Breeders' here organized into one band. What could I do ? What could the Legislature do in this country if it were not for organization of this kind ? If you are separate individuals you are utterly helpless. I have recognized that as an individual, no matter how much ability I possess, I can accomplish very little, but when I get two, or three, or four or five hundred others we have considerable power. You therefore, have power with the Legislature, you have power with other bodies you meet, and your President knows something of how this power has been exercised of late. I had the honor, accompanied by your President, to meet the railway magnates of this country. We were undertaking to get better rates for pure-bred horses, the same as we have induced them to give better rates for pure bred cattle and sheep. The object is to encourage the people to go long distance in order to secure the male animals they desire to use for the improvement of their stock. Now I have gone on other occasions to these gentlemen, and I could not have the slightest influence, but when you go and say you are backed by five hundred bound together in one industry, and so many others in another, it is then they will listen to what you have to say, and when they find what is said to them is in the interest of the country it is bound to make an impression on the railway authorities. And I may say they gave us the same privileges in transportation with reference to horses as we have had with cattle and sheep. (Hear, hear.)

Now there are various other ways in which the organization can be helpful. A grant has been given to the Horse Breeders' Association in this Province, as you know,

for the purpose of holding an exhibition in this city of Toronto. There may be representatives who think this is a little one-sided ; they think that because the exhibition is held in Toronto it is doing everything for this city and not much for the other parts of the Province, and they sometimes tell us that Toronto should be spelt with three letters H-O-G. Now,I take the ground,—and I have taken the ground in the Legislature,and do not hesitate to take it here—that it is not a Toronto Show. If it were a Toronto show I could not justify the expenditure of so large a sum. But it is in the best sense of the word a Provincial Exhibition, it represents the whole Province, and it gathers together from every part of the Province exhibits which are a credit to those who show, and a credit to this country. You might hold a dozen exhibitions, you might separate them, and you would not make any decided advance ; but by combining together as you do in this exhibition you do make an impression on our own country and our own people, and you attract foreign buyers, and every time you get a buyer from New York, Chicago or Buffalo the whole horse industry profits as a result. You thus benefit every man who is breeding horses in this country, and I think, therefore, we ought to remember that this Provincial Exhibition is a great benefit to the horse breeding industry of this country. We have proof of our ability in this country to breed good horses. The New York market, the Buffalo market, the market in Liverpool, and other places in Great Britian, will testify to what I have to say.

The other day I got some testimony which seems to speak very loudly in this regard. The men belonging to the field battery men who went from Guelph took with them 138 horses, they travelled a long way over the sea, losing some on the voyage—and any gentleman who has had any experience in shipping horses knows how hard it is to take such a large number of horses such a long distance without considerable loss, yet after putting in one year's hard service they had upwards of seventy horses to sell. Now I think that speaks well for Canadian horses, and I need not give the Premier any better evidence of the excellent quality of the horses in this country. And I understand the Canadian horses were capable of standing more rough usage than any others out there, with the exception, perhaps, of those born and bred there.

The Premier has told you of the desirability of a remount station. If we had this remount station in this country it would give an impetus to the horse-breeding industry that cannot be given in any other way. Get something definite for the farmers to produce, and they have the skill and energy to produce what is required ; all they want is to be shown what is required. Now if we are to go forward and produce a better class of horses that will be required for the British army, how shall it be done? I am afraid I do not agree with the opinions of some of you in regard to getting the farmers to produce a better type of horse. Some of the live stock men think all that is necessary is to get the Legislature to put some law on the statute book to compel them under penalty to walk in the direction you indicate. You cannot take the farmers by the throat and undertake to drive them just the way you desire, and this is a matter that requires serious consideration as the Premier says. And so my policy has alwaye rather been in the other direction, that is, to teach them what is best for themselves. You may feel disposed to go in a certain direction yourselves, but just as soon as any one attempts to drive you, you are apt to become contrary. This is how it is with the average individual. In seeking to improve our horse industry or any other industry you should endeavor to obtain this end by education rather than by compulsion. We have made considerable advances in this direction, and with continued organization we shall no doubt make rapid advances in the future. My heart is with you as horse-breeders, as it is with any other body of farmers in the country, and anything the Agricultural Department can do will be done as in the past.

We now know—and there is not a man but feels a greater thrill of pride run through him because we are Canadians—that the name of Canada has now a new ring not only in our own land but in every other land ; our products are being looked upon favorably, and all we need to do is to use our intelligence and skill to the best advantage and we can produce not only what Britain wants, but what the world wants in all these directions.

Mr. Thos. Crawford, M.P.P., in a brief but practical address, said that the Government would have the entire support of the Opposition in any movement for advancing the export trade in Canadian horses.

Mr. Andrew Patullo, M P.P., deplored the fact that farmers freely disposed of their best mares, instead of keeping and breeding from them, and regretted that Canada

had not been more liberally favored with orders for horses to serve in South Africa. He thought the farmers of the country could supply the entire needs of the British army. He, as did all the speakers, warmly endorsed the proposal to establish remount depots in Canada.

Lieut. Col. Lessard, Ald. Sheppard, Ald. Lynd, Messrs. D. B. Simpson, K. C., G. W. Beardmore, M.F.H., Edmund Bristol, Murray Hendrie, S. F. Houston, S. B. Chapman, J. Innes, and H. J. Hill made short addresses evincing the warmest interest in the horse, and predicting considerable development in the future, specially if farmers would aim to breed to type.

SEVENTH ANNUAL CANADIAN HORSE SHOW.

The Seventh Annual Canadian Horse Show of 1901 was a four days' affair, extending from April 24th to the 27th. This was rendered necessary in order to include the features of a military tournament, with which for the sake of economy in running, the show was amalgamated this year as it was in 1898. Each had their turn, morning, afternoon, and evening, when the ring in the big armouries was under the control, for a specified time, of each party to the agreement.

The weather, which was very unpleasant on the first day of the show, cleared up at night, and the three last days were bright and pleasant. Nothing, however, could deter the crowds which thronged the building day after day, the attendance on Friday and Saturday being record ones. Nor was the tournament part of the proceedings alone responsible for this, because lovers of the horse were there in large numbers, and the tournament proceedings interested them only very slightly.

There was no formal opening of the show, but Lord Minto, the Governor General, was present on Friday and Saturday, and took great interest in the proceedings, especially in the special class for horses over four years old, sired by a Thoroughbred stallion, in which he donated $50, and a handsome silver cup in a suitable cabinet as a first prize. Hon. Sydney Fisher, though unable to be present, very kindly gave a donation of $20 to the second prize winner in this class.

All classes were well represented, though there were a few weak spots in the breeding classes. The harness and saddle classes were very strong and contained a great many very choice animals. So satisfactory was the judging that there was not a single protest made. It had been said by pessimists before the show that so many good horses had been sold to go away that there would not be enough to make a good display. The result has falsified these predictions, and it shows that, now that breeders have some ideal to go by, they are producing in large numbers the best kind of horses that the market calls for. The more our breeders and farmers visit this show the better posted they will be as to the requirements of the market, the class of horse it will pay to breed to, and the monetary advantage it is to have a horse well groomed and trained. There is really no excuse for those who breed horses staying away from the show. The admission fee of twenty-five cents is as low as it can possibly be, and the seeding in most parts was so far advanced this year that a day at least could have been most profitably spent inspecting the equine beauties. The first day of the show was set apart for farmers, and most of the breeding classes were shown on that day, thus giving their owners the opportunity of returning their stallions to their routes with the least possible delay.

Prize List.

The following list gives the prize winners at the Seventh Annual Canadian Horse Show held April 24, 25, 26, 27th, 1901, and the names of the owners :

Thoroughbreds.

Judges :—Jno. Hanning, New York ; Chas. McEachern, V.S., Montreal.

Stallions foaled previous to January 1st, 1898.

1st. Kapanga, chestnut, aged. Exhibitor, Dr. A. Smith, Toronto ; sire, Spendthrift (imp.); dam, Kapanga.
2nd. Gold Car, chestnut, foaled in 1896. Exhibitor, W. Hendrie, Hamilton ; sire, Goldfinch ; dam, Carina.
3rd. Terremont, bay, foaled in 1894. Exhibitors, A. Frank & Sons, The Grange ; sire, Dandie Dinmont (imp.) ; dam, Jenny Lind.

Stallions qualified to improve the breed of saddle horses and hunters.

1st. Ballymore, bay, foaled in 1892. Exhibitors, Telfer & Climie Co , Montreal : sire, Hollywood ; dam, Highland Girl.
2nd. Billetto, bay, foaled in 1884. Exhibitor, W. A. Barbour, Toronto : sire, Billet (imp.) : dam, Calomel.
3rd. Rothewal, brown, foaled in 1892. Exhibitors, Telfer & Climie Co., Montreal; sire, Morglay ; dam, Happy Girl.

Championships, King Edward 7th's prize.

Best Thoroughbred Stallion.

1st. Ballymore. Exhibitors, Telfer & Climie Co., Montreal.

CARRIAGE OR COACH STALLIONS.

JUDGES :—R. Gibson, Delaware ; A. Galbraith, Janesville, Wis.

Stallions foaled previous to January 1, 1898.

1st. Performer, brown, foaled in 1896. Exhibitors, Crow & Murray.
2nd. Graf Bremer, brown, foaled in 1889. Exhibited by Jas. McCartney, Thamesford ; sire, Vales Edzad 937 ; dam, Vongmosfrust 850.
3rd. General Watson, bay, foaled in 1894. Exhibitor, Jno. Rogers, Thornhill : sire, Sim Watson ; dam, Lady Jefferson.

Stallions foaled subsequent to and on January 1st, 1898.

1st. Lord Roberts, bay, foaled in 1898. Exhibitor, J. L. Reid, Derry West.
2nd. Lord Roberts (1126) bay, foaled in 1898. Exhibitor, A. Hewson, Grahamsville.

Sweepstakes—Best Stallion, any age.

1st. Performer. Exhibitors, Crow & Murray, Toronto.

STANDARD-BRED STALLIONS.

Stallions foaled previous to January 1st, 1898.

JUDGES :—C. E. Elliott, V.S., St. Catharines ; H. W. Ten Eyck, Hamilton.
1st. Dalton McCarthy 33903, bay, foaled in 1896. Exhibitor, W. A. Collins, Hamilton ; sire, Bryson 34324 ; dam, Viola.
2nd. Altoneer 17493, bay, foaled in 1890. Exhibitors, Fisher & Button, Ringwood : sire, Sphnix 5343 : dam, Pilotma Wilkes.
3rd. Pavonia 15034, chestnut, foaled in 1892. Exhibitors, Heslop & Williamson, Appleby : sire, Jersey Wilkes 2516 ; dam Pansy.

Stallions foaled subsequent to and on January 1st, 1898.

1st. Jim Bryson 34324, bay, foaled in 1898. Exhibitor, F. J. Hassard, V.S., Caledon East.

Sweepstakes—Best Stallions, any age.

1st. Dalton McCarthy 33903. Exhibitor, W. A. Collins, Hamilton.

HACKNEYS.

Stallions foaled previous to January 1st, 1898.

JUDGES :—A. Galbraith, Janesville, Wis.; R. Gibson, Delaware.
1st. Squire Rickell—74—264, chestnut, foaled in 1895. Bred by Twaddell & Sharp, Devon, Pa. Exhibited by R. Beith, Bowmanville ; sire, Cadet (imp.)—15—107 (1251) ; dam, Miss Rickell (imp.)—14—237 (1284).

Stallions foaled subsequent to and on January 1st, 1898.

1st Connaught Heir—116—chestnut, foaled in 1898. Bred by Herbert Webster, Durham, Eng. Exhibited by Bawden & McDonell, Exeter : sire, Lambton Cannaught (5251) : dam, Lady Confidence (6861).
2nd. Rosseau Royal Oak—78—black, white strip on face, feet and ankles white, foaled in 1898. Bred and exhibited by H. N. Crossley, Rosseau : sire, Royal Standard (imp.)—55—3918 ; dam, Lady Cocking (imp.)—11—(5530).
3rd. Guelph Performer—89—brown, star on forehead, off hind foot white, foaled May 27th, 1899. Bred by D. & O. Sorby, Guelph. Exhibited by O. Sorby, Guelph : sire, Square Shot (imp.)—27 ; dam, Miss Baker (imp.)—16—(4371).

Mares foaled subsequent to and on January 1st, 1898.

1st. Hermia—90—bay, foaled in 1898. Bred and exhibited by R. Beith, Bowmanville : sire, Royal Standard (imp.)—55—(5097) ; dam, Cherry Ripe—70—567.
2nd. Titania—103—chestnut, ratch on face, off fore and hind feet white, foaled May 10th, 1899. Bred and exhibited by R. Beith, Bowmanville ; sire, Squire Rickell—74—264 : dam, Mona's Queen (imp.) —4—(5887).
3rd. Countess Josephine—111—bay, hind feet white below ankles, foaled Jan. 18th, 1899. Bred and exhibited by H. N. Crossley, Rosseau ; sire, Fireworks (imp.)—16—(3602) ; dam, Althorpe Countess (imp.)—25—(6357).

High Stepper, mare or gelding not under 15 hands : conformation and style of going, as well as high action, to be considered ; to be shown before a suitable conveyance, and sired by a registered Hackney Stallion.

1st. South Africa, br. mr , 5 yrs. old. Exhibitor, G. H. Gooderham, Toronto.
2nd. The Widow, gr. mr., 5 yrs. old. Exhibitor, S. B. Fuller, Woodstock.
3rd. Defender, br. g., 6 yrs. old. Exhibitors, Doane Bros., Toronto.

Sweepstakes. Best Hackney Stallion, any age, given by Canadian Hackney Horse Society

1st. Squire Rickell—74. Exhibitor, R. Beith, Bowmanville.

Sweepstakes. Best Hackney mare, any age, given by Canadian Hackney Horse Society.

1st. Hermia—90. Exhibitor, R. Beith, Bowmanville.

Sweepstakes. Best Hackney mare or filly, by an imported sire and out of an imported dam, both registered in the English Hackney Stud Book. Given by the Hackney Horse Society of Great Britain.

1st. Countess Josephine—111. Exhibitor, H. N. Crossley, Rosseau.

Sweepstakes. Best Hackney Stallion, or Entire Colt, by an imported sire out of an imported dam, both registered in the English Hackney Stud Book. Given by the Hackney Horse Society of Great Britain.

1st. Squire Rickell—74. Exhibitor, R. Beith, Bowmanville.

SHIRES.

JUDGES:—R. Gibson, Delaware: A. Galbraith, Janesville, Wis.; Jas. Henderson, Belton.

Stallions foaled previous to January 1st, 1898.

1st. Belshazzar [296] (13855), bay, foaled in 1891. Bred by Rich. Tomlinson, Rishton, England. Imported and exhibited by Bawden & McDonnell, Exeter; sire, Timon (5394); dam, Ivus (12596).

2nd. Wilcott Thompson (imp.) [294] (18452), bay, foaled in 1897. Bred by Jno. Green, Shrewsbury, Eng., imported and exhibited by Bawden and McDonnell, Exeter; sire, Walcott Carbon (14940); dam, Darby (16493).

Stallions Foaled Subsequent to and on January 1st, 1899.

1st. Pride of Morning, dark brown, foaled May, 1899. Bred by Morris, Stone and Wellington, Fonthill. Exhibited by Jno. Gardhouse, Highfield; sire, Pride of Hatfield (imp.) [256] (13103); dam, Queen [65].

Mare, Any Age.

1st. Victoria, [147], black, foaled June, 1899. Bred and exhibited by J. M. Gardhouse, Highfield; sire, Darnley (imp.) [183] (3585); dam, Queen of Highfield [117].

2nd. Violet [126] bay, foaled in 1897. Bred by Morris, Stone and Wellington, Fonthill, Exhibited by Jno Gardhouse, Highfield; sire, Pride of Hatfield (imp.) [256] (13104); dam, Elsie Morin (imp.) [34].

3rd. Laura [112] bay, foaled May 1st, 1896. Bred by Morris, Stone and Wellington, Fonthill. Exhibited by Jno. Gardhouse, Highfield; sire, Pride of Hatfield (imp.) [256] (13104); dam, Daisy [82].

CLYDESDALES.

JUDGES: A. Galbraith, Janesville, Wis.; Jas. Henderson, Belton; Geo. Cockburn, Baltimore.

Stallions Foaled previous to January 1st, 1898.

1st. King of the Clydes (imp.) [2529] bay, foaled April 27, 1897. Bred by representatives of Late Alex. Gibson, Brechin, Scot. Exhibited by J. M. Gardhouse, Highfield; sire, Ringleader (10427); dam, Jess (11346).

2nd. Cloth of Gold [2946] chestnut, foaled March 31st, 1877. Bred by R. Holloway, Alexis, Ill. Exhibited by O. Sorby, Guelph; sire, Lord Charming [2264]; dam, Madge 3rd, 4096.

3rd. Harmony (imp.) [2951] (10772) bay, foaled in 1900. Bred by W. McConnell, Kirkcowan, Scot. Exhibited by Robt. Graham, Ringwood; sire, Prince of Carmelian (8151); dam, Melody (12837).

Stallions Foaled in 1898.

1st. Copyright (imp.) [2739] (10724), brown, foaled May 16th, 1898. Bred by A. Mitchell, Barcheskie, Scot. Exhibited by Robt. Ness, Howick, Que.; sire, Baron's Pride (9122); dam, Trilby of Barcheskie (12582).

2nd. Lyon Stewart [2732] bay, foaled June 7th, 1898. Bred by Jno. Stewart, Springbank. Exhibited by H. G. Boag, Churchill; sire, Lassodie Rover (imp.) [2725] (9779; dam, Houstin Lassie (imp.) [679].

3rd. Sir Redvers (imp.) [2950] (10923) brown, foaled May 8th, 1898. Bred by Marquis of Londonderry, Seaham Harbor, Eng. Exhibited by Robt. Graham, Ringwood; sire, Knight of Cowal (10074); dam, Garnet (8675).

Stallions Foaled Subsequent to and on January 1st, 1899.

1st. Bay Chief [2955] bay, foaled Aug. 20th, 1899. Bred by D. Major & Son, Whitevale. Exhibited by J. W. Cowie, Markham; sire, Lord Wellington (6981); dam, Jenny [2935].

2nd. Laurentian [2954] bay, foaled May 26th, 1899. Bred and exhibited by Robt. Ness, Howick, Que.; sire, Lawrence Again (imp.) [2047]; dam, Roseleaf (imp.) [2465].

3rd. Charming Lad [2923], bay, foaled July 1st, 1899. Bred and exhibited by O. Sorby, Guelph; sire, Lord Charming [2264]; dam, Venus [2064].

Canadian Bred Clydesdale Stallions, Foaled Previous to January 1st, 1900.

1st. Gay McGregor [2922] bay, foaled May 29th, 1899. Bred and exhibited by D. Carstairs, Bomanton; sire, Erskine Macgregor (imp.) [2225] (1543); dam, Bertie [2909].

Clydesdale Mares, Imported or Canadian Bred, Any Age.

1st. Sonsie Lass [2313] bay, foaled April 8th, 1893. Bred by N. P. Clark, St. Cloud, Minn. Exhibited by O. Sorby, Guelph; sire, Second Choice (imp.) [1431] (8244); dam, Sonsie [996].

2nd. Diana McKay [2314] bay, foaled May 11th, 1892. Bred by N. P. Clark, St. Cloud, Minn. Exhibited by O. Sorby, Guelph; sire, MacKay (imp.) [2267] (5194); dam, Jane Eyre (imp.) [217]
3rd. Kitty Tyrall [2934] bay, foaled July 19th, 1892. Bred by Jno. Gormley, Unionville. Exhibited by A. G. Gormley, Unionville; sire, Lord Lieutenant (imp.) [196] 4520; dam, Queen of the West 8219.

Pair of Draught Mares or Geldings, any Breed, Shown in Harness.

1st. Sonsie Lass [2313]; Diana McKay [2314]. Exhibitor, O. Sorby, Guelph.
2nd. Kitty Tyrall [2934]; Meadow Lark. Exhibitor, A. G. Gormley, Unionville.
3rd. Crown, bay g.; Joe, bay g. Exhibitor, Geo. Moore, Waterloo.

HORSES IN HARNESS.

JUDGES.—G. B. Hulme, New York; Robt. Graham, Claremont.

Mare or Gelding over 14 Hands 1 inch and not exceeding 15 Hands 1 inch. To be shown to a Gig, Cart, or Phaeton.

1st. Always Ready, b. g., 5 yrs. Exhibitor, G. H. Gooderham, Toronto.
2nd. Rosseau Jewel—79—brown roan m. Exhibitor, H. N. Crossley, Rosseau.
3rd. Candidate, b. m., 7 yrs. Exhibitor, C. Boeckh, Toronto.

Mare or Gelding over 15 hands 1 inch and not exceeding 15 hands 3 inches.

1st. South Africa, b. m., 5 yrs. Exhibitor, G. H. Gooderham, Toronto.
2nd. Josephine, b. m., 5 yds. Exhibitors, Doane Bros., Toronto.
3rd. Lady, b. m., 5 yrs. Exhibitor, Chas. Head, Guelph.

Mare or Gelding exceeding 15 hands 3 inches.

1st. Vulcan, blk. g., 7 yrs. Exhibitor, Mrs. F. M. Fraser, Toronto Junction.
2nd. Winnie Honor, b. m., 6 yrs. Exhibitor, J. Ross Robertson, Toronto.
3rd. Dude, b. g., 6 yrs. Exhibitor, P. Maher, Toronto.

Pair of Horses, Mares or Geldings 15 Hands 2 inches and under. To be shown to a Four Wheeled Vehicle.

1st. Always Ready, b. g., 6 yrs.; Just Ready, b. g., 5 yrs. Exhibitor, G. H. Gooderham, Toronto.
2nd. Flashlight, b. m., 6 yrs.; Sunlight, b. m., 7 yrs. Exhibitors, Crow & Murray, Toronto.
3rd. Ace of Hearts, b. g., 6 yrs.; Ace of Diamonds, b. g., 6 yrs. Exhibitors, Yeager & Curzon, Simcoe.

Pair of Horses, Mares or Geldings over 15 Hands 2 inches. To be shown to a Four Wheeled Vehicle.

1st. Napoleon, b. g., 6 yrs,; Josephine, b. m., 5 yrs. Exhibitors, Doane Bros., Toronto.
2nd. Dude, b. g., 6 yrs.; Victor, b. m., 6 yrs. Exhibitor, P. Maher, Toronto.
3rd. Winnie Honor, b. m., 6 yrs.; Canadian, b. g., 5 yrs. Exhibitor, J. Ross Robertson, Toronto.

Pair of Horses not under 15 Hands 2 inches. To be shown to a Brougham. Horses to count 60 per cent., Brougham and General Appointments 40 per cent. First Prize presented by Mr. T. J. Crow.

1st. Mohawk, b. g., 5 yrs.; War Cry, b. g., 5 yrs. Exhibitor, Geo. Gooderham, Toronto.
2nd. Winnie Honor, b. m., 6 yrs.; Canadian, b. g., 5 yrs. Exhibitor, J. Ross Robertson, Toronto.

Champion Harness Horse Class. Open to Mares or Geldings which have taken a First Prize in Single or Double Harness at this or any previous recognized Horse Show.

1st South Africa, br. m., 5 yrs. Exhibitor, G. H. Gooderham, Toronto.

TANDEMS.

Harness Tandem. Wheeler to be over 15 Hands.

1st. Always Ready, b. g., 6 yrs.; Just Ready, b. g., 5 yrs. Exhibitor, G. H. Gooderham, Toronto.
2nd. Napoleon, b. g., 6 yrs; Josephine, b. m., 5 yrs. Exhibitors, Doane Bros., Toronto.
3rd. Rossland, br. g., 5 yrs.; Rory, br. g., 5 yrs. Exhibitor, W. H. Smith, Toronto.

FOUR IN HANDS.

Teams not under 15 Hands. May be shown before a Coach, Drag, or Brake.

1st. Exhibitor, G. H. Gooderham, Toronto.
2nd. Exhibitors, Crow & Murray, Toronto.
3rd. Exhibitors, Yeager & Curzon, Simcoe.

SADDLE HORSES.

JUDGES.—G. B. Hulme, New York; E. Grundell, Hampstead, L. I.; Colin Campbell, Montreal.

Best Saddle and Harness Horse, Mare or Gelding 15 Hands or over, to be shown first in Harness and afterwards under Saddle.

1st. Queen Bertha, gr. m., 7 yrs. Exhibitors, G. Pepper, Toronto.
2nd. Blucher, b. g., 6 yrs. Exhibitor, St. Clair Balfour, Hamilton.
3rd. Trilby, ch. m., 5 yrs. Exhibitors, Yeager & Curzon, Simcoe.

Mare or Gelding over 14 Hands 2 inches and not exceeding 15 Hands 2 inches.

1st. Nelson Victory, gr. g., 5 yrs. Exhibitor, L. Meredith, London.
2nd. Sir Beauty, ch. g., 7 yrs. Exhibitor, H. N. Shaw, Toronto.
3rd. Wide Awake, br. m., 5 yrs. Exhibitor, W. Mann, Newmarket.

Mare or Gelding over 15 Hands 2 inches, up to carrying 160 lbs.

1st Athlete 2nd, b. g., 4 yrs. Exhibitors, Yeager & Curzon, Simcoe.
2nd Falkirk, b. g., 5 yrs. Exhibitor, L. Meredith, London.
3rd Cardinal, b. g., 5 yrs. Exhibitor, Allan A. Case, Toronto.

Mare or Gelding over 15 Hands 2 inches, up to carrying 200 lbs.

1st. Queen Bertha, gr. m., 7 yrs. Exhibitor, G. Pepper, Toronto.
2nd. King Edward, b. g., 4 yrs. Exhibitor, S. B. Fuller, Woodstock.
3rd. Tipperary, br. g., 6 yrs. Exhibitor, Mr. W. Woodruff, St. Catharines.

Lady's Saddle Horse, not under 14 Hands 3 inches. To be ridden by Ladies.

1st. Cardinal, br. g., 5 yrs. Exhibitor, Allan A. Case, Toronto.
2nd. Fancy, br. m., 7 yrs. Exhibitor, Miss Clute, Toronto.
3rd. Scout, b. g., 5 yrs. Exhibitor, Hume Blake, Toronto.

Champion Saddle Horse.

1st. Queen Bertha, gr. m.. 7 yrs. Exhibitor, G. Pepper, Toronto.

HUNTERS AND JUMPERS.

Qualified Hunters, Heavy Weight.

2nd. Osprey, w. m., 5 yrs. Exhibitor, E. Phillips, Toronto.

Qualified Hunters, Light Weight.

1st. Patrol, b. g., 6 yrs. Exhibitor, Hume Blake, Toronto.
2nd. Myopia, b. g., 6 yrs. Exhibitor, G. Pepper, Toronto.
3rd. My Fellow, ch. g., 7 yrs. Exhibitor, A. Beck, London.

Green Hunters, Heavy Weight.

1st. Hotspur, b. g., 6 yrs. Exhibitor, A. Beck, London.
2nd. Balgarnie, ch. g., 5 yrs. Exhibitor, St. Clair Balfour, Hamilton.
3rd. Perfect, br. m., 4 yrs. Exhibitor, G. Pepper, Toronto.

Green Hunters, Light Weight.

1st. Plucky Lad, b. g., 4 yrs. Exhibitors, Stewart, Craig & Galloway, Guelph.
2nd. Gay Falconer, ch. g., 4 yrs. Exhibitor, A. Beck, London.
3rd. Lord Minto, b. g., 4 yrs. Exhibitor, G. Pepper, Toronto.

Jumping, open to all. Performances over fences only to count.

1st. Lord Minto, b. g., 4 yrs. Exhibitor, G. Pepper, Toronto.
2nd. Pearl, b. m., aged. Exhibitor, G. Pepper, Toronto.
3rd. Sweetbriar, b. m., 5 yrs. Exhibitor, W. Buckle, Guelph.

Best performance over 6 Jumps, 2 at 4 feet, 2 at 4 feet, 6 inches, and 2 at 5 feet. Carrying not less than 140 lbs.

1st. Pearl, b. m., aged. Exhibitor, G. Pepper, Toronto.
2nd. Bassoon, br. g., 6 yrs. Exhibitor, G. Pepper, Toronto.
3rd. Dolly, b. m., 5 yrs. Exhibitor, G. Pepper, Toronto.

Corinthian Class—Open to hunters. Horses must be ridden by members of some recognized Hunt. Conformation and quality to count 25 per cent.; performance over fences 75 per cent.

1st. Cockatoo, b. g., 10 yrs. Exhibitor, G. W. Beardmore, Toronto.
2nd. Pearl, b. m., aged. Exhibitor, G. Pepper, Toronto.
3rd. Myopia, b. g., 5 yrs. Exhibitor, G. Pepper, Toronto.

Toronto Hunt Plate, open to horses owned and ridden by members of the Toronto Hunt. Performances over fences to count 50 per cent.; conformation and quality to count 50 per cent.

1st. Patrol, br. g., 6 yrs. Exhibitor, Hume Blake, Toronto.
2nd. Primrose. ch. m., 6 yrs. Exhibitor, Dr. A. Smith, Toronto.
Equal 2nd. Cardinal, br. g. 5 yrs. Exhibitor, Allan A. Case, Toronto.

Champion Hunter Class.

1st. Patrol, br. g. 6 yrs. Exhibitor, Hume Blake, Toronto.

ROADSTERS, STANDARD AND NON-STANDARD.

JUDGES: C. E. Elliott, St. Catharines; M. H. Ten Eyck, Hamilton.

Mare or gelding under 15.3 hands..

1st. Excellence, b. g., 5 yrs. Exhibitor, J. J. Burns, Toronto.
2nd. Nutcracker, ch. g., 4 yrs. Exhibitor, Thos. B. Taylor, Toronto.

Mare or gelding, 15.3 hands and over.

1st. Ponoka, ch, g., 7 yrs. Exhibitor. A. A. Hood, Toronto.
2nd. William N., br. g., 8 yrs. Exhibitor, T. Bartrem, Toronto.

Pair of Roadsters, mares or geldings.

1st. George, b. g., 6 yrs.; Billy, b. g., 5 yrs. Exhibitor. L. C. A. Strother, Toronto.
2nd. Wilkey Belle, b. m., 6 yrs.; Altonelle, b. m., 5 yrs. Exhibitor, F. J. Gallanough, V.S., Thornhill.

PONIES.

JUDGES: R. Gibson. Delaware; Robt. Graham, Ringwood.

Pony in harness, 12 hands 2 inches high and under.

1st. Lady Constance, ch. m., 6 yrs. Exhibitors, Misses G. & J. Gooderham, Toronto.
2nd. Lady Isabella, ch. m., 5 yrs. Exhibitors, D. & H. Gooderham, Toronto.

Pony in harness over 12 hands 2 inches and not exceeding 14.1 hands.

1st. Donington 3rd, b. g., 6 yrs. Exhibitor, R. Beith, Bowmanville.
2nd. Canadian Ensign, b. g., 4 yrs. Exhibitor, John Lennox, Toronto.

SPECIAL CLASSES.

JUDGES: B. Hulme, New York; R. Graham, Ringwood; F. Taylor, New York.

Best and Best appointed pair of horses to be shown in Landeau. Best and Best appointed pair to Victoria. Single horse in Brougham. Each exhibitor to show in all three events. Horses to be the bona-fide property of exhibitor at time of entry, and be in actual use for livery work.

1st. Exhibitors, Doane Bros., Toronto.
2nd. Exhibitors, Doane Bros., Toronto.

Mare or gelding in single harness and delivery waggon as actually used in local deliveries.

1st. Daisy, gr. m., 7 yrs. Exhibitor, Robt. Simpson Co., Toronto.
2nd. Maud, b. m., 6 yrs. Exhibitor, City Dairy Co., Toronto.

Mare or gelding to be shown in single harness and butchers' cart as used in local deliveries.

1st. Ladysmith, ch. m., 7 yrs. Exhibitor, J. W. Holman, Toronto.
2nd. William N., br. g., 8 yrs. Exhibitor, T. Bartrem, Toronto.

Best Performance of Professional Private Coachman, in livery with pair and Carriage, to Landeau, Brougham, or heavy Victoria.

1st. W. S. Douglas, coachman for W. D. Beardmore, Toronto.
2nd. F. Harland, coachman for Mrs. W. Woodruff, St. Catharines.
3rd. J. Morton, coachman for Geo. Gooderham, Toronto.

Pair of Horses suitable for Victoria, to be shown before a Victoria. Professional dealers or makers excluded. Prize given by Messrs. Hutchison & Son.

1st. Always Ready, b. g., 6 yrs.; Just Ready, b. g., 5 yrs. Exhibitor, G. H. Gooderham, Toronto.

Best 4 year old Canadian-bred gelding or mare suitable for riding or cavalry purposes, not less than 15 hands and not over 15.3, to be sired by thoroughbred stallion. First prize given by Lord Minto. Second prize by Hon. Sidney Fisher.

1st. Cremorne, b. g., 4 yrs. Exhibitor, L. Meredith, London.
2nd. Scottie, ch. g., 4 yrs. Exhibitor, R. Porteous, Simcoe.

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